

# Cognitive Rigor: Augmenting Writing Skills in the EFL Classroom

Recently, educators have called for raising the expectation of students' learning through teaching more rigorous knowledge and skills. For defining and describing rigor, a cognitive rigor (CR) matrix was used in the present study to augment tertiary, female, Saudi students' non-fiction writing skills in terms of *organization, development, cohesion/coherence, structure, vocabulary and mechanics*. The quasi-experimental design was employed using one experimental group (EG) and one control group (CG). Both groups were pre-tested and post-tested in writing a non-fiction essay. The Mann-Whitney U test demonstrated that there were statistically significant differences between the mean ranks of the EG and those of the CG on the post-test favoring the former.

*Keywords:* Bloom's Taxonomy, Depth of Knowledge, cognitive rigor matrix, non-fiction, writing skills

## Introduction

*"It is time to expect more from our students," (Barack Obama, 2009).*

Writing is a dynamic component of students' literacy achievement, and it is a critical communication tool for them to convey opinions, describe ideas, and analyze information. Besides, in this modern hi-tech world, writing is a skill that plays an increasingly important role in success across academic and professional disciplines; word processing and other forms of electronic communication help students learn and practice writing in and out of the classroom. Consequently, the nature of writing and writing instruction is changing. That is, there is a paradigm shift in writing instruction which includes integrated interventions that involve many complementary instructional practices.

However, research piloted in the Arab world showed that EFL learners suffer from poor performance complications and low proficiency level in writing skills (Rababah, 2003; Al-Jarf, 2007; Bacha, 2010; Ezza, 2010; Javid, & Umer, 2014). Alnufaie and Grenfell (2012), for example, conducted a study to investigate the writing strategies of 121 second-year, undergraduate Saudi students who were studying EFL in Jubail Industrial College (JIC). The writing strategies under investigation were process-oriented and product-oriented. Findings showed that 95.9% of the participants missed the two kinds of strategies.

Grami (2010) cited the results of IELTS test report of Saudi students, which revealed that they scored comparatively low in all English language skills (5.17, 4.97, 5.81 out of 9 in listening, reading and speaking respectively) but the average in writing skills was the lowest (4.83 out of 9). Al-Nofal, (2003) comprehended

1 that when Saudi students write essays, they are generally concerned with surface  
2 aspects such as spelling, choosing vocabulary and correcting grammatical  
3 mistakes.

4 Al-Samadani (2010) views writing as a complex process in teaching and  
5 learning as it requires knowledge of grammar, vocabulary, writing mechanics  
6 (e.g., punctuation & capitalization), organizational skills, style, and imagination.  
7 Fageeh (2011) claimed that, “many EFL learners heavily rely on writing as  
8 integral skill to language learning” p. 31, as supported by much research that view  
9 learners’ listening, speaking and reading skills mainly depend on writing  
10 competence (e.g., Al-Ghamari, 2004; Hinkel, 2004).

11 The release of *A Nation at Risk* (1983) aroused the debate about the quality of  
12 American schools. With the adoption of *No Child Left Behind* (2001), governors  
13 used the word “rigorous” as the adjective to describe a desired type of education.  
14 Former President George W. Bush used the term in his 2006 State of the Union  
15 Address, “We need ... to make sure those courses are rigorous enough to compete  
16 with other nations”. From presidents to principals, governors to teachers,  
17 everybody tried to be either promising rigor, demanding rigor, or deploring the  
18 lack of rigor. It was concluded that academic rigor is an important part of  
19 providing the next generation with the knowledge and skills necessary to succeed  
20 in education and career.

## 21 22 23 **Theoretical Background**

24  
25 Literally, *rigor* refers to “the quality of being severe or strict” while *rigor*  
26 *mortis* is “the process by which the body becomes stiff after death” (Oxford  
27 Advanced Learner’s Dictionary, 1999, p. 1013). According to this definition,  
28 people may equate *rigor* with pain, rigid thinking, and harshness. Its association in  
29 *rigor mortis* gives the impression that students must suffer, as the curriculum must  
30 be narrow and deadly dull.

31 Yet, educationally, rigor seems to be the opposite of the dictionary meaning.  
32 With non-rigorous learning, errors are more likely to occur. Rigor is not assigning  
33 more homework. It is assigning better homework, open-ended work that pushes  
34 students to think in multiple ways about the tasks, and provides constructive  
35 feedback on their efforts – plus permission to edit, test prototypes, and make  
36 multiple drafts. Most important, the teacher will not accept work that is less than  
37 the students’ best effort.

38 On May 5, 2005, the North Carolina State Board of Education (NCSBoE)  
39 passed into law High Student Performance Bill F16 requiring that all students  
40 graduate from a rigorous academic program that equips them with the knowledge,  
41 skills, and dispositions necessary to succeed in both postsecondary education and  
42 21<sup>st</sup>-century careers. It recommended the following:

43

- 1 • Academic rigor is based on established expectations that ensure that all  
2 students develop the capacity to master content that is complex and  
3 challenging.
- 4 • In every subject, at every grade level, instruction and learning must include  
5 commitment to a knowledge core and application of that knowledge core to  
6 solve complex and real-world problems.
- 7 • A rigorous course is a course that examines details, insists on diligent and  
8 scrupulous study and performance, and does not settle for a mild or informal  
9 contact with the key ideas. It focuses on skills that students will be expected  
10 to master – rather than just the content they will memorize.

11  
12 To sum up, academic rigor is an essential characteristic of effective  
13 curriculum, instruction, and assessment. When they are challenged, students learn  
14 to use the full range of their talents and intellectual abilities to address authentic  
15 and complex academic tasks in professional and real-life events. Academic rigor is  
16 commonly thought of in terms of three different phases in the educational process.  
17 The first is setting the standard for students; the second is equipping students  
18 through instructional and supportive methods; and the third is student  
19 demonstration of achievement. Those three phases were popularized by Barbara  
20 Blackburn’s 2008 book *Rigorous Schools and Classrooms: Leading the Way*. She  
21 defined rigor as, “*creating an environment in which each student is expected to*  
22 *learn at high levels, each student is supported so he or she can learn at high*  
23 *levels, and each student demonstrates learning at high levels.*” Consequently,  
24 Williamson (2012) divides this definition into:

25  
26 **Part I – Expecting students to learn at high levels;** rigorous education begins  
27 with a belief that each student has the potential to be her or his best, no matter  
28 what.

29 **Part II – Supporting students to learn at high levels;** as students move to more  
30 challenging work, there is simultaneous *scaffolding* to support students.  
31 Students are not left on their own to succeed.

32 **Part III – Ensuring students demonstrate learning at high levels;**  
33 demonstrations of learning mean that instruction is not totally teacher-  
34 centered. Students should be provided with opportunities to demonstrate their  
35 learning.

36  
37 To achieve rigorous academic standards, the academic, social, and  
38 developmental needs of students must be addressed. Irrespective of student’s  
39 socio-economic background or educational experience, they get an opportunity to  
40 succeed at high levels. Therefore, in a report by Colvin and Jacobs (2009), a  
41 rigorous curriculum is “focused, coherent, and appropriately challenging,” said  
42 William Schmidt, a Michigan State professor who studies the educational practices  
43 of countries that surpass the United States on international tests. In this report, the  
44 superintendent Jerry D. Weast mentioned that his school achieved “giving students

1 a curriculum that will prepare them to succeed in college or the world of work,” p.  
2 3. In non-pretentious terms, students should use content knowledge about a subject  
3 to comprehend, apply, analyze, synthesize, and evaluate it. Teachers should create  
4 an environment in which each student is supported so he or she can learn at high  
5 levels.

6 Wyatt, Wiley, Camara, and Proestler’s study (2012) was an attempt to create  
7 an index of academic rigor using self-reported course work data that would assist  
8 in providing information on the academic preparation of over one million  
9 graduating high school seniors each year. It used the SAT<sup>®</sup> Questionnaire (SAT-  
10 Q) that students completed when registering for the SAT exam to construct an  
11 academic rigor index (ARI).

12 Two widely accepted models for describing academic rigor: the revised  
13 Bloom's Taxonomy of Educational Objectives (2001) and Norman Webb’s Depth  
14 of Knowledge (DOK) model (1997). The former categorizes the cognitive skills  
15 required of the brain when faced with a new task as it describes the type of  
16 thinking processes necessary to answer a question. The latter, on the other hand,  
17 relates more closely to the depth of content understanding and scope of a learning  
18 activity, which manifests in the skills required to complete the task from inception  
19 to finale (e.g., planning, researching, drawing conclusions). Moreover, the DOK  
20 model offers to rethink the meaning of *test alignment* to include both the content  
21 assessed in a test item and the depth to which students are expected to demonstrate  
22 understanding of that content.

23 Because no simple one-to-one correspondence relates Bloom's Taxonomy and  
24 DOK model, Hess, Jones, Carlock and Walkup (2009) combined both of them.  
25 The result was the **cognitive rigor** (CR) matrix, which allowed educators to  
26 examine the rigor associated with tasks that might seem at first glance comparable  
27 in complexity. Because CR encompasses the complexity of content, the cognitive  
28 engagement with that content, and the scope of the planned learning activities, the  
29 CR matrix can enhance instructional and assessment practices at the classroom  
30 level as well. The present study adapted this matrix as a means of determining the  
31 emphasis placed on each of its intersections in actual teaching non-fiction essay  
32 writing. Then, recognizing CR and analyzing its implications for instruction and  
33 assessment, the researchers tried to enhance learning opportunities for the EG  
34 students in an essay-writing course. That is, those treatment students were  
35 provided with a wide range of the CR matrix in augmenting their writing skills.

### 36 37 38 **Objectives of the study:**

39  
40 In the writing class, to increase CR is to intensify the complexity of a text.  
41 A text is complex because of the complexity of ideas, one’s confusion in the  
42 expression of thoughts (Dougherty, 2015). Focusing on the essential components  
43 of the CR matrix, the present study aimed at:  
44

- 1 a. adapting the CR matrix to be used in improving the writing skills
- 2 identified by Paulus (1999) in his rubrics (Appendix 2) in terms of
- 3 *organization, development, cohesion/coherence, structure, vocabulary and*
- 4 *mechanics*; and
- 5 b. exploring the effect of using CR on augmenting some non-fiction, writing
- 6 skills of some EFL students who were involved in a rigorous, essay-writing
- 7 course.

## 10 **Statement of the Problem**

11  
12 Graduation from college has been associated with a wide variety of positive  
13 financial and societal outcomes. Despite several efforts made by stakeholders,  
14 syllabus designers, teachers and administrators, the Saudi students face maximum  
15 problems in their EFL writing (Al-Hazmi, 2006; Al-Khasawneh, 2010; Al-  
16 Samadani, 2010; Ezza, 2010; Grami, 2010). Specifically, at Qassim Private  
17 Colleges (QPC), the researchers observed that students did not reach the  
18 envisioned writing assessment goals by the end of each semester. That is, students  
19 at all levels are required to answer short-essay questions and write compositions  
20 which are evaluated by their teachers on the basis of their precision and  
21 excellence.

22 Besides, as it is intensive and comprehensible, the present research used a  
23 rigorous course to augment the expectation of some EFL students regarding their  
24 non-fiction, writing skills. In simpler terms, the adapted CR matrix was used in  
25 respect of what was imparted in addition to how it was communicated and  
26 assessed. That is, CR was introduced as an essential characteristic of effective  
27 curriculum, instruction, and assessment. Students were challenged to use the full  
28 range of their talents and intellectual abilities to address authentic and complex  
29 academic tasks writing non-fiction essays. Achieving this, the present study  
30 attempted to answer the following research questions:

- 31
- 32 1. How can the CR matrix be adapted for teaching non-fiction, writing skills?
- 33 2. What is the impact of CR on augmenting the non-fiction writing skills of
- 34 EFL students?
- 35
- 36

## 37 **Methodology:**

### 38 *Design:*

39  
40  
41 The research methodology was quasi-experimental, where both quantitative  
42 methods were employed for comparing the improvement achieved after the  
43 treatment by an experimental group (EG) and a control group (CG). Being adapted  
44 to implement rigor in the class, the CR matrix is a scale of cognitive demand  
45 (thinking) to align standards with assessments for ensuring that the content of the

1 standard and the level of student demonstration required by that standard matches  
2 the assessment items.

### 3 4 *Participants*

5  
6 The sample taken for the study was 29 female students enrolled in Level 4 at  
7 the English Department, Qassim Private Colleges, KSA. Those students were  
8 distributed randomly in two groups: 12 were assigned to EG, while the other 17 to  
9 CG and both of them were taught to write an essay according to non-fiction  
10 writing skills (i.e., *organization, development, cohesion/coherence, structure,*  
11 *vocabulary and mechanics*). Both groups were asked to write an essay at the  
12 beginning and at the end of the study. The EG students were interviewed by the  
13 end of the study.

### 14 15 *Setting*

16  
17 During the first semester of the academic year 2017/2018, the experiment  
18 lasted for a total of ten weeks of teaching the above-mentioned writing skills. Pre-  
19 and post-tests were administered in the form of writing an essay to both groups.  
20 Both groups' scores were compared in the pre-test and the post-test.

## 21 22 23 **Results and Discussion**

24  
25 **The first research question:** *How can the CR matrix be adapted for teaching*  
26 *non-fiction, writing skills?*

27  
28 In 2009, teachers from 200 Nevada and Oklahoma public schools submitted a  
29 collection of 200,000 samples of student homework samples, tests, quizzes, and  
30 worksheets in mathematics and English language arts for analyzing the  
31 preponderance of curricular items aligned to each cell in the CR matrix by Hess,  
32 Jones, Carlock and Walkup (2009). The present study made use of this matrix to  
33 augment 29 EFL students' non-fiction writing skills. The teacher, the first  
34 researcher, was concerned with applying a rigorous atmosphere to one of her two-  
35 section, essay-writing course. She taught a textbook: *Effective Academic Writing*  
36 *2: The Short Essay*. This course familiarizes students them with forming a  
37 paragraph to a short essay in term of the ideas expressed in the introduction, the  
38 body and the concluding paragraphs. Focusing on the following will enhance  
39 writing skills: journal writing, specialized essays, and paragraph analysis.

40 Implementing this, the CR matrix was adapted (Appendix 1) for teaching the  
41 writing skills aimed at by this course. Originally, the CR matrix consists of 24  
42 cells; namely, 6 levels of the revised Bloom's Taxonomy (horizontally)  
43 dichotomized into 4 levels of DOK (verticallay). The teacher sorted all the  
44 instructional tasks into categories according to the adapted CR matrix; then she  
45 focused on items where the major cognitive demand was placed. For 10 weeks, 3

1 hours each, she taught an essay-writing course for 2 sections (EG and CG). Both  
 2 groups were given some instructions on how to generate ideas in order to develop  
 3 different parts of a paragraph and a well-written essay (i.e., topic sentence, an  
 4 introduction paragraph, major and minor supporting sentences, and the concluding  
 5 paragraph). For the latter group, she followed the objectives of the course; whereas  
 6 for the former, she designed her lesson plans and classroom assessments according  
 7 to the adapted matrix for a greater range of cognitive demand. That is, she  
 8 provided the EG with challenging tasks and demanding goals, which enhanced  
 9 both surface and deep learning of content to make sure that they could gain most  
 10 from the learning opportunities she designed.

11 According to the 6 levels of the revised Bloom's Taxonomy, in **level 1**, for  
 12 example, the students were gradually engaged in listing ideas or words as in a  
 13 brainstorming activity prior to writing composition, or were asked to write simple  
 14 sentences. In **level 2**, students were engaged in the first draft writing or brief  
 15 extemporaneous speaking for a limited number of purposes and audiences.  
 16 Students began to connect ideas using a simple organizational structure. For  
 17 example, students might be engaged in note-taking, outlining or simple  
 18 summaries. Text may be limited to one paragraph. In **level 3**, students were  
 19 engaged in developing compositions that included multiple paragraphs. These  
 20 compositions included complex sentence structure and demonstrated some  
 21 synthesis and analysis. Students showed awareness of their audience and purpose  
 22 through focus, organization and the use of appropriate compositional elements.  
 23 The use of appropriate compositional elements included chronological order in a  
 24 narrative or including supporting facts and details in an informational report. At  
 25 this stage, students were engaged in editing and revising to improve the quality of  
 26 the composition. The last **level 4**, the standard at this level was a multi-paragraph  
 27 composition that demonstrated synthesis and analysis of complex ideas or themes.  
 28 There was evidence of deep awareness of purpose and audience.

29 As the CR matrix is means of analyzing the emphasis placed on each of its  
 30 intersections, teachers should be skilled at recognizing CR so that they can  
 31 enhance learning opportunities that covers a wide range of the matrix. According  
 32 to Dougherty (2015), the most common way to increase rigor in a task depends  
 33 upon a number of factors like difficult and unfamiliar vocabulary and syntax or  
 34 complexity of ideas, doubt and confusion in expressing thoughts.

35

36 **The second research question:** *What is the impact of CR on augmenting the non-*  
 37 *fiction, writing skills of EFL students?*

38

39 For proving the equivalence between the two groups before the treatment, the  
 40 students were pre-tested writing a compare-and-contrast essay "My Two Cities".  
 41 Analysis of the students' essays was based on the Paulus' rubrics (1999)  
 42 (Appendix 2). Those rubrics were designed to give clear and detailed explanation  
 43 of writing skills in terms of *organization, development, cohesion/coherence,*  
 44 *structure, vocabulary* and *mechanics* according to a 1-to-10-point scale. The  
 45 Mann-Whitney test for small samples where ( $n \leq 20$ ) was used to determine the

1 significant differences between the mean ranks of the EG and those of the CG.  
 2 **Table 1** shows that all the U-values are not significant at 0.05 level, which means  
 3 that the two groups were equivalent.

4  
 5 **Table 1:** U Values between the mean ranks of both EG and CG in the pre-test

Writing Skills	Groups	n.	Mean Ranks	Sum of Ranks	U	Sign.
Organization	CG	17	16.97	288.50	68.50	0.097
	EG	12	12.21	146.50		
Development	CG	17	16.18	275.00	82.00	0.312
	EG	12	13.33	160.00		
Coherence/Cohesion	CG	17	14.18	241.00	88.00	0.461
	EG	12	16.17	194.00		
Structure	CG	17	14.62	248.50	95.50	0.739
	EG	12	15.54	186.50		
Vocabulary	CG	17	13.32	226.50	73.50	0.144
	EG	12	17.38	208.50		
Mechanics	CG	17	13.71	233.00	80.00	0.213
	EG	12	16.83	202.00		
Total	CG	17	14.65	249.00	96.00	0.787
	EG	12	15.50	186.00		

6  
 7 Then, it was crucial to determine whether any improvement in students'  
 8 writing occurred as a result of being involved in the treatment, so the study sample  
 9 in both of the EG and CG were post-tested following the same procedures in the  
 10 pre-test. **Table 2** shows that all the U-values are significant at 0.05 level, which  
 11 means that there were statistically significant differences between the mean ranks  
 12 of the EG and those of the CG in favor of the former group. In addition, it is also  
 13 clear that the values of the effect size were larger than 0.15, indicating that the  
 14 effect size of experimental treatment was significant and contributed to the total  
 15 variance of writing skills by 79%.

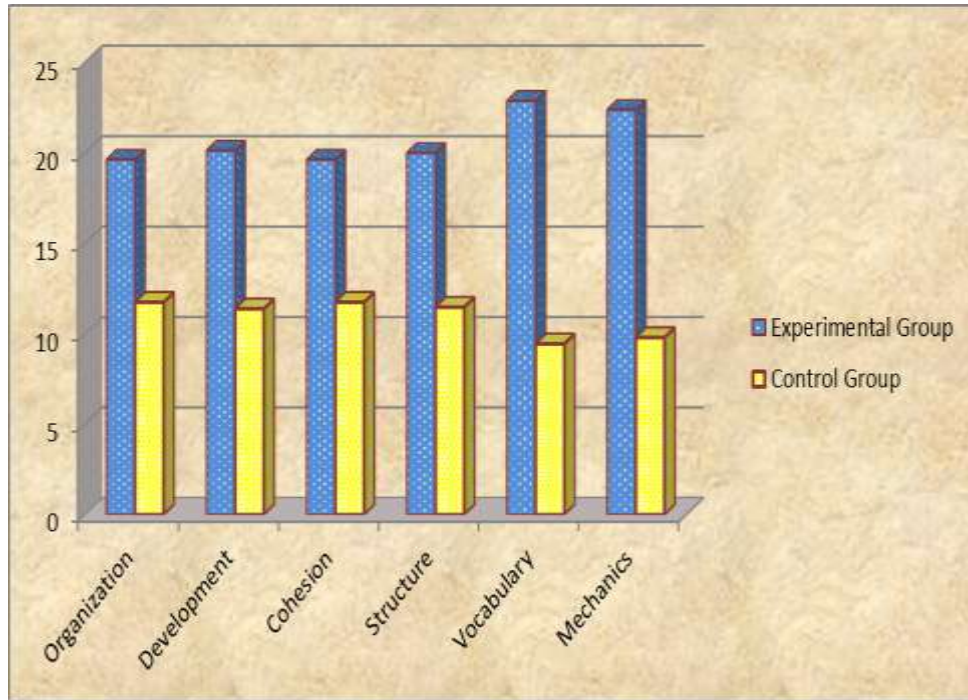
16  
 17 **Table 2:** U Values between the mean ranks of both EG and CG in the post-test

Writing Skills	Groups	n.	Mean Ranks	Sum of Ranks	U	Sign.	eta	Effect Size
Organization	CG	17	19.63	235.50	46.50	0.005	0.53	great
	EG	12	11.74	199.50				
Development	CG	17	20.13	241.50	40.50	0.003	0.55	great
	EG	12	11.38	193.50				
Coherence/Cohesion	CG	17	19.63	235.50	46.50	0.005	0.52	great
	EG	12	11.74	199.50				
Structure	CG	17	20.00	240.00	42.00	0.003	0.55	great
	EG	12	11.47	195.00				
Vocabulary	CG	17	22.88	274.50	7.50	0.001	0.82	great
	EG	12	9.44	160.50				
Mechanics	CG	17	22.38	268.50	13.50	0.001	0.77	great
	EG	12	9.79	166.50				
Total	CG	17	23.00	276.00	6.00	0.001	0.79	great
	EG	12	9.35	159.00				

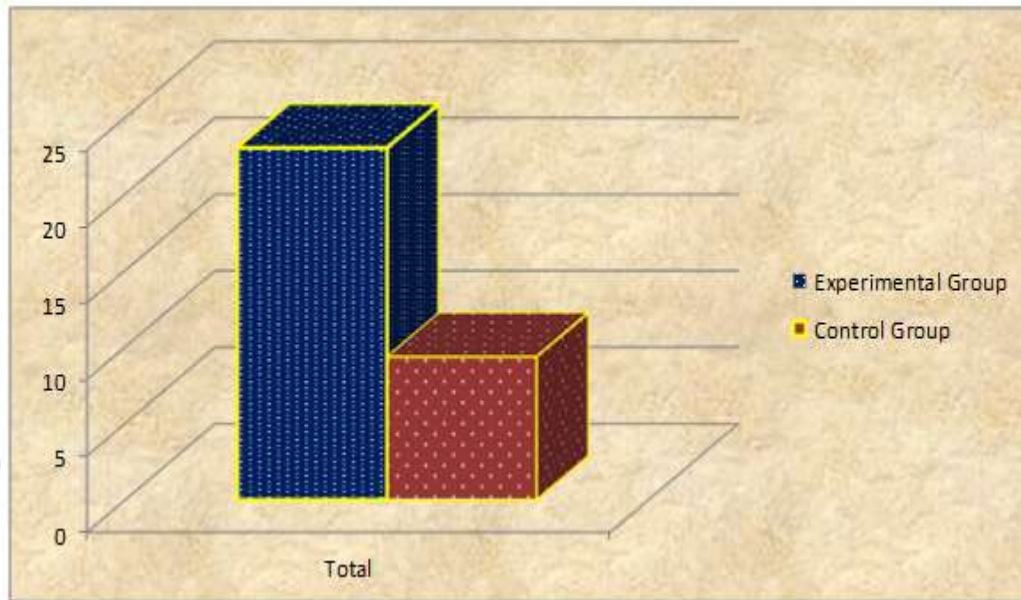


1 This clearly indicates a major impact of CR on students' non-fiction, writing  
2 skills. In accordance of Williamson's division (2012), each student of the  
3 treatment group was expected to learn at high levels, was supported in learning at  
4 high levels, and had the opportunity to demonstrate learning at high levels. This  
5 can be due to the teacher's influence upon students was effective in directing their  
6 achievement towards learning objectives. Thompson and Wiliam (2008) confirms  
7 that, "teacher quality trumps virtually all other influences on student achievement"  
8 p. 2. Therefore, it is rightly said "a qualified teacher has the methodological  
9 competence to enable students to develop skills for creativity and understanding"  
10 (Ololube, 2006, p. 41).

11 Referring to **Figure 1** and **Figure 2**, the EG showed a significant rise after the  
12 implementation of the CR matrix and the students' scores were satisfactorily good.  
13 This can be due to focusing on having a clearly-relevant and effective content,  
14 concrete, logical, and convincing supporting examples, and the appropriate use of  
15 transitional devices, referential ties, and logical connectors. In addition, the EG  
16 was trained to pay their undivided attention to the structure and vocabulary used in  
17 their sentences (e.g., tenses, parts of speech, pronouns, articles, prepositions,  
18 conjunctions, and nouns) in order to produce grammatically-correct and clear  
19 sentences. The appropriate use of mechanical devices was stressed as well.  
20 According to the aforementioned Williamson's division (2012), the final section of  
21 the training was slightly different. That is, for having the opportunity to have  
22 support and to demonstrate their work, the treatment students were divided into  
23 two groups: givers and receivers, the former was given some instructions on how  
24 to review the essays and give feedback and the latter was trained to use the  
25 feedback to revise their essays. Later, the roles were reversed.  
26  
27



1 **Figure 1:** Mean ranks of EG and CG in the post-test  
 2 **Figure 2:** Mean ranks of EG and CG in the post-test total scores



3  
 4 Group work in the Saudi universities is still not recommended and valued  
 5 because the teacher is regarded as the only one who has the knowledge. Therefore,  
 6 students felt the difference of being involved in the present research. For the  
 7 students, writing as a means of creating and forming ideas, and working with their  
 8 peers required them to be engaged in multiple-intellectual levels. Group work was  
 9 used as a tool for enhancing rigor in the class as what Rice and Hughley (1994)

1 asserted that this work is performed by two or more people to produce and  
 2 complete a text, and it includes brainstorming and generating ideas, planning and  
 3 organizing, drafting, revising, and editing.

4 Checking the EG students' reaction before and after the experiment, the  
 5 second researcher interviewed some of them randomly. The results from the  
 6 interview showed that the EG learners' attitudes were moderately positive;  
 7 consequently, enhancing their writer's anxiety and apprehension. Before  
 8 implementing rigor, one of those students' response was "*Whenever I start a*  
 9 *paragraph or an essay writing task, I face difficulty of organizing my ideas,*  
 10 *introduction, main topic, supporting sentences for what I intend to write. I lack the*  
 11 *ability to write a good essay*". The same student, after the post-test, her attitude  
 12 changed as she felt being more motivated and more positive; her grades had not  
 13 only improved but she freely expressed her ideas and participated in the class: she  
 14 did not have the fear.

15 Another student said, "*I always get the idea. When I speak with a peer friend*  
 16 *or the teacher, the idea develops from one paragraph to other... It really helps;*  
 17 *when I speak with others I get what I need to write in the essay. But when I am*  
 18 *writing alone, I am fixed at the topic sentence and lost ....*"

19 Price (2004) mentions that "cognitive styles reflect the ways in which  
 20 individuals process information and make sense of their world" p.683. Having  
 21 raised the cognitive demands, the teacher created a "knowledgeable pressure" by  
 22 asking for increasingly deeper examinations and elaborations in student work. This  
 23 progression might move from a task asking for explaining a simple concept to a  
 24 one requiring explaining a more complex concept. Atkinson (2004) suggests that a  
 25 cognitive style is "a distinct and consistent way for an individual to encode, store  
 26 and perform" p. 663, and is thus related to approaches in learning situations.

27 Students mentioned that the teacher gradually asked them to write essays from  
 28 easy to difficult tasks. Namely, she gave them initially to write a paragraph about  
 29 themselves 'A biography' which was at the outset not so easy to understand the  
 30 organizational pattern to write a paragraph (i.e. to write a reader's attention topic  
 31 sentence, supporting sentences to the main idea and an appropriate conclusion).  
 32 However, with the teacher's feedback and scaffolding effort, the EG students  
 33 could write a five-paragraph essay.

34 The EG satisfactorily felt more contented about their writing after the  
 35 treatment as they were encouraged to assess their peers' essays before final  
 36 submission. Tolmie *et al.*, (2010) suggested that getting support from peers is  
 37 more positive as learning tension is reduced because of the increase in mutual  
 38 understanding between learning parties. Nevertheless, one student's reaction was  
 39 different from those of the other interviewees; simply, she preferred writing  
 40 independently, as she thought that it took a long time to finish writing essay when  
 41 peers were involved.

42 Therefore, the findings indicated that those students who had been involved in  
 43 rigorous learning had improved in all the intended aspects of writing; namely,  
 44 *organization, development, cohesion/coherence, structure, vocabulary* and  
 45 *mechanics*. However, they had improved more in some aspects and categories than

1 in others. Overall, the impact was satisfactory. The attitudes and perceptions of the  
 2 students had also improved as it appeared from their responses to the interview.

### 5 **Conclusion**

7 The CR matrix was used to reach the level of the expected outcomes of the  
 8 non-fiction, writing skills. CR includes the basic philosophy of learning that we  
 9 expect our students to demonstrate not only content mastery, but also the skills and  
 10 critical thinking about the disciplines being taught. To enhance the writing skills in  
 11 the EFL classroom, rigor which was introduced in the present study as a strategy  
 12 to fill this need, and to raise the standards of students' achievement, which were  
 13 previously showing considerable fall in their accomplishment.

14 Educators should use the CR matrix to align the content in their curricular  
 15 materials to the instructional techniques used in classroom delivery. The CR  
 16 matrix focuses on complexity of content standards to successfully complete a task.  
 17 Because CR encompasses the complexity of content, the cognitive engagement  
 18 with that content, and the scope of the planned learning activities, the CR matrix  
 19 can enhance instructional and assessment practices at the classroom level as well.

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## Appendix 1

*Cognitive Rigor (CR) Matrix\* with Examples for Augmenting Non-Fiction Writing Skills*

\*Adapted from Hess, K. Jones, S., Carlock, D., & Walkup, J. (2009). *Cognitive rigor: Blending the strengths of Bloom's*

Bloom's Taxonomy levels	Webb's Depth-of-Knowledge Levels			
	Level 1 Recall and Reproduction	Level 2 Skills and Concepts	Level 3 Strategic Reasoning	Level 4 Thinking/Extended Thinking
<b>Remember</b> Retrieve knowledge from long-term memory, recognize, recall, locate, identify	Recall, recite, recognize, locate basic facts, or ideas			
<b>Understand</b> Construct meaning, clarify, para- phrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion, predict, compare/contrast, match like ideas, explain, construct models	List ideas or words Write simple sentences Describe/explain how or why	Specify and explain relationships Give non-examples/examples Make and record observations Summarize ideas Infer or predict from data or texts Identify main ideas	Explain, generalize, or connect ideas using supporting evidence Write full composition of multiple paragraphs to meet a specific purpose Identify themes	Explain how concepts or ideas specifically relate to other content domains or concepts
<b>Apply</b> Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	Apply punctuation, capitalization, grammar and spelling rules Use resources to edit spelling and grammar	Write a paragraph using appropriate organization, text structure	Use reasoning, planning, and evidence Edit a final draft for meaning or logical progression of ideas Construct complex sentences	Illustrate how multiple themes (historical, geographic, social) may be interrelated
<b>Analyze</b> Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct (e.g., for bias or point of view)	Identify Standard English grammatical structures Locate specific information contained in maps, charts, tables, graphs, or diagrams	Categorize, classify materials Select appropriate data demonstration Identify use of literary devices Identify text structure of paragraph Refer to sources for correction Take notes, or outline	Compare information within or across data sets or texts Analyze and draw conclusions Organize/interpret data Analyze author's craft or viewpoint	Analyze multiple sources of evidence or multiple works by the same author, or across genres Analyze complex/abstract themes Gather, analyze, and organize information Analyze discourse styles
<b>Evaluate</b> Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique		Connect ideas with simple organizational strategies Construct compound sentences	Cite evidence, facts and details to develop a logical argument for viewpoints Describe, compare, and contrast Use a chronological order in a narrative	Apply understanding in a novel way, provide argument or justification for a viewpoint
<b>Create</b> Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, and produce	Brainstorm ideas, concepts, or perspectives related to a topic or a concept	Generate conjectures or hypotheses based on observations or prior knowledge Write summaries of the main ideas or details in a reading selection	Synthesize information within one source or text Develop a concept map for a given text Show awareness of audience and purpose through focus, voice, and organization	Write an analysis of multiple selections, identifying the common theme and generating a purpose that is appropriate for both

*taxonomy and Webb's depth of knowledge to enhance classroom-level* [Online]. Available:  
<https://files.eric.ed.gov/fulltext/ED517804.pdf>.

## Appendix 2 Essay Scoring Rubrics\*\*

Scale	Organization/Unity	Development	Cohesion/Coherence	Structure	Vocabulary	Mechanics
1.	No organization evident; ideas random, related to each other but not to task; no paragraphing; no thesis; no unity	No development	Not coherent; no relationship of ideas evident	Attempted simple sentences; serious, recurring, unsystematic grammatical errors obliterate meaning; non-English patterns predominate	Meaning obliterated; extremely limited range; incorrect/unsystematic inflectional, derivational morpheme use; little to no knowledge of appropriate word use regarding meaning and syntax	Little or no command of spelling, punctuation, paragraphing, capitalization
2.	Suggestion of organization; no clear thesis; ideas listed or numbered, often not in sentence form; no paragraphing/grouping; no unity	Development severely limited; examples random, if given.	Not coherent; ideas random/unconnected; attempts at transitions may be present, but ineffective; few or unclear referential ties; reader is lost.	Uses simple sentences; some attempts at various verb tenses; serious unsystematic errors, occasional clarity; possibly uses coordination; meaning often obliterated; unsuccessful attempts at embedding may be evident	Meaning severely inhibited; very limited range; relies on repetition of common words; inflectional/ derivational morphemes incorrect; unsystematic; very limited command of common words; seldom idiomatic; reader greatly distracted	Some evidence of command of basic mechanical features; error-ridden and unsystematic
3.	Some organization; relationship between ideas not evident; attempted thesis, but unclear; no paragraphing/ grouping; no hierarchy of ideas; suggestion of unity of ideas	Lacks content at abstract and concrete levels; few examples	Partially coherent; attempt at relationship, relevancy and progression of some ideas, but inconsistent or ineffective; limited use of transitions; relationship within and between ideas unclear/non-existent; may occasionally use appropriate simple referential ties such as coordinating conjunctions	Meaning not impeded by use of simple sentences, despite errors; attempts at complicated sentences inhibit meaning; possibly uses coordination successfully; embedding may be evident; non-English patterns evident; non-parallel and inconsistent structures	Meaning inhibited; limited range; some patterns of errors may be evident; limited command of usage; much repetition; reader distracted at times	Evidence of developing command of basic mechanical features; frequent, unsystematic errors
4.	Organization present; ideas show grouping; may have general thesis, though not for persuasion; beginning of	Underdeveloped; lacks concreteness; examples may be inappropriate, too general; may use main points as	Partially coherent, main purpose somewhat clear to reader; relationship, relevancy, and progression of ideas	Relies on simple structures; limited command of morpho-syntactic system; attempts at embedding may be evident in	Meaning inhibited by somewhat limited range and variety; often uses appropriately informal lexical	May have paragraph format; some systematic errors in spelling, capitalization, basic punctuation



Scale	Organization/Unity	Development	Cohesion/Coherence	Structure	Vocabulary	Mechanics
	hierarchy of ideas; lacks overall persuasive focus and unity	support for each other	maybe apparent; may begin to use logical connectors between/within ideas/paragraphs effectively; relationship between/within ideas not evident; personal pronoun references exist, may be clear, but lacks command of demonstrative pronouns and other referential ties; repetition of key vocabulary not used successfully	simple structures without consistent success; non-English patterns evident	items; systematic errors in morpheme usage; somewhat limited command of word usage; occasionally idiomatic; frequent use of circumlocution; reader distracted	
5.	Possible introduction, body, conclusion; obvious, general thesis with some attempt to follow it; ideas grouped appropriately; some persuasive focus, unclear at times; hierarchy of ideas may exist, without reflecting importance; some unity	Underdeveloped; sections may have concreteness; some may be supported while others are not; some examples may be appropriate supporting evidence for a persuasive essay, others may be logical fallacies, unsupported generalizations	Partially coherent; shows attempt to relate ideas, still ineffective at times; some effective use of logical connectors between/within groups of ideas/paragraphs; command of personal pronoun reference; partial command of demonstratives, deictics, determiners	Systematic consistent grammatical errors; some successful attempts at complex structures, but limited variety; clause construction occasionally successful meaning occasionally disrupted by use of complex or non-English patterns; some non-parallel, inconsistent structures	Meaning occasionally inhibited; some range and variety; morpheme usage generally under control; command awkward or uneven; sometimes informal; unidiomatic, distracting; some use of circumlocution	Paragraph format evident; basic punctuation, simple spelling, capitalization, formatting under control; systematic errors
6.	Clear introduction, body, conclusion; beginning control over essay format, focused topic sentences; narrowed thesis approaching position statement; some supporting evidence, yet ineffective at times; hierarchy of ideas present without always reflecting idea importance; may digress from topic	Partially underdeveloped, concreteness present, but inconsistent; logic flaws may be evident; some supporting proof and evidence used to develop thesis; some sections still under-supported and generalized; repetitive	Basically coherent in purpose and focus; mostly effective use of logical connectors, used to progress ideas; pronoun references mostly clear; referential/anaphoric reference may be present; command of demonstratives; beginning appropriate use of transitions	Some variety of complex structures evident, limited pattern of error; meaning usually clear; clause construction and placement somewhat under control; finer distinction in morpho-syntactic system evident; non-English patterns may occasionally inhibit meaning	Meaning seldom inhibited; adequate range, variety; Appropriately academic, formal in lexical choices; successfully avoids the first person; infrequent errors in morpheme usage; beginning to use some idiomatic expressions successfully; general command of usage; rarely distracting	Basic mechanics under control; sometimes successful attempts at sophistication, such as semi-colons, colons
7.	Essay format under control; appropriate paragraphing and topic sentences; hierarchy of ideas present; main points include persuasive evidence; position statement/thesis narrowed and directs essay;	Acceptable level of development; concreteness present and somewhat consistent; logic evident, makes sense, mostly adequate supporting proof; may be	Mostly coherent in persuasive focus and purpose, progression of ideas facilitates reader understanding; successful attempts to use logical connectors, lexical repetition, synonyms,	Meaning generally clear; increasing distinctions in morpho-syntactic system; sentence variety evident; frequent successful attempts at complex structures; non-English patterns do not inhibit	Meaning not inhibited; adequate range, variety; basically idiomatic; infrequent errors in usage; some attention to style; mistakes rarely distracting; little use of circumlocution	Occasional mistakes in basic mechanics; increasingly successful attempts at sophisticated punctuation; may have systematic spelling errors

Scale	Organization/Unity	Development	Cohesion/Coherence	Structure	Vocabulary	Mechanics
	may occasionally digress from topic; basically unified; follows standard persuasive organizational patterns	repetitive	collocation; cohesive devices may still be inconsistent/ ineffective at times; may show creativity; possibly still some irrelevancy	meaning; parallel and consistent structures used		
8.	Definite control of organization; may show some creativity; may attempt implied thesis; content clearly relevant; convincing; unified; sophisticated; uses organizational control to further express ideas; conclusion may serve specific function	Each point clearly developed with a variety of convincing types of supporting evidence; ideas supported effectively; may show originality in presentation of support; clear logical and persuasive/convincing progression of ideas	Coherent; clear persuasive purpose and focus; ideas relevant to topic; consistency and sophistication in use of transitions/ referential ties; effective use of lexical repetition, derivations, synonyms; transitional devices appropriate/ effective; cohesive devices used to further the progression of ideas in a manner clearly relevant to the overall meaning	Manipulates syntax with attention to style; generally error-free sentence variety; meaning clear; non-English patterns rarely evident	Meaning clear; fairly sophisticated range and variety; word usage under control; occasionally unidiomatic; attempts at original, appropriate choices; may use some language nuance	Uses mechanical devices to further meaning; generally error-free
9.	Highly effective organizational pattern for convincing persuasive essay; unified with clear position statement; content relevant and effective	Well-developed with concrete, logical, appropriate supporting examples, evidence and details; highly effective/convincing; possibly creative use of support	Coherent and convincing to reader; uses transitional devices/referential ties/logical connectors to create and further a particular style	Mostly error-free; frequent success in using language to stylistic advantage; idiomatic syntax; non-English patterns not evident.	Meaning clear; sophisticated range, variety; often idiomatic; often original, appropriate choices; may have distinctions in nuance for accuracy, clarity	Uses mechanical devices for stylistic purposes; may be error-free
10.	Appropriate native-like standard written English	Appropriate native-like standard written English	Appropriate native-like standard written English	Appropriate native-like standard written English	Appropriate native-like standard written English	Appropriate native-like standard written English

\*\*SOURCE: Paulus, T. M. (1999). The effect of peer and teacher feedback on student writing. *Journal of Second Language Writing*, 8, 265-289; as used by: Lundstrom, K. (2006). Teaching Writing Through Peer Revising and Reviewing. *All theses and dissertations*, 937. Available: <https://scholarsarchive.byu.edu/etd/937>