THE ROLE OF COMPUTERS IN WRITING PROCESS

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ABSTRACT
In this paper, the role of computers in writing process was investigated. Last 25 years of journals were searched to find related articles. Articles and books were classified under prewriting, composing, and revising and editing headings. The review results showed that computers can make writers' job easy in the writing process. In addition, literature results revealed that teachers, peers, instructional strategies, and computer software all together have some important roles to develop students' writing ability. Simplifying the revising process is the biggest expectation from computers.

Keywords: Computer, prewriting, composing, revising and editing

YAZMA İŞLEMİNDE BİLGİSAYARLARIN ROLÜ

ÖZET
Bu çalışmada, bilgisayarın yazma işlemindeki rolü incelenmiştir. Son 25 yılda yayınlanan dergiler ilgili makaleleri bulmak için incelenmiştir. Kitaplar ve makaleler yazımöncesi, yazma ve gözden geçirip düzeltme başlıkları altında sınıflandırılmıştır. Tarama sonuçları bilgisayarların yazma işleminde yazıcının işini kolaylaştırdığını göstermiştir. Buna ek olarak, ilgili alanyazın öğretmenlerin, akranların, öğretim stratejilerinin ve bilgisayar yazılımlarının hep birlikte öğrencilerin yazma becerilerini geliştirmede önemli rolleri olduğunu göstermiştir. Bilgisayarlardan olan en önemli beklenti gözden geçirme ve düzeltme işlemini basitleştirmesidir.

Anahtar sözcükler: Bilgisayar, yazımöncesi, yazma, gözden geçirme ve düzeltme

I. INTRODUCTION

Nowadays, computers offer many specialties to use in the writing process. They have prompts to keep writers on the point, highlight possible spelling mistakes, and offer a communication channel for corresponding with friends and colleagues (Daiute, 1985). Regardless of the writing medium, all good writing moves through an authoring cycle that begins with thinking about or discussing the topic and making prewriting notes. After the prewriting, writers can work on writing as an initial draft. When writers revise and edit, they can take their peers', teachers', and editors' ideas about the papers (Strassman & D'Amore, 2002).

In the writing process, computer and computer software can be valuable tool for many students. In addition to this, word processing, speech recognition, speech feedback, word prediction, and other varieties of software packages may help students with learning disabilities to participate in well-developed classroom writing programs (Williams, 2002).

Hartley, Howe, and McKeachie (2001) determined the following possibilities when the word processors were used in the writing process:

1- Writing with a word-processor might not involve any changes in processes or in the resulting products.
2- Writing with a word processor might involve some changes in processes, but without any obvious effects on the resulting products.
3- Writing with a word-processor might involve some changes in processes, leading to some changes (hopefully improvements) in the resulting products (p. 142).

The main purpose of this paper is to examine and investigate the literature to see how computers can be used and are used in the writing process. To determine the possible use of computers in the writing process, last 25 years of journals were searched, and related books were examined. Daiute (1985) classified writing process under the three headings. These are prewriting, composing, and revising and editing. As this classification covers the whole writing process, related research can be examined under these headings.

II. PREWRITING

"Student writers sometimes have trouble getting started because they do not know what to say" (Daiute, 1985, p. 73). Writers may not have a reason to write or they may not know enough about the topics. They use different techniques during the writing process. Some of them do much of their writing, planning, and revising in their heads, and some of them make notes or outlines. Some writers may focus on grammar and phrasing. Some other writers, on the other hand, think on paper, and write freely (Daiute, 1985).

According to Daiute (1985), researchers Janet Emig, Lillian Bridwell, and others have described two composing styles. The first one is Mozartian style. In this kind of plan, writers write clearly, and revise their sentences while they are writing. The second composing style is Beethovian. When writers follow this plan, they write quickly and freely, but make extensive revision. Many writers use both of these composing styles to complete the writing task.

Generally, writers prefer to plan before writing. "Planning is one of the most important processes in writing; researchers have found that it often accounts for more than half of a writer's time" (Daiute, 1985, p. 77). Students can use computers effectively to plan their writing. They can prepare a list of words or ideas. Then, they can rearrange these words in related clusters. Students can do same activity with pencil and paper, but computers can offer them more features. For example, they can easily organize their list of words. Teachers can also make some prescribed sections, headings, and even introductory sentences on computers. Because of the flexibility of the word processing programs, students can make changes easily. For instance, *QUILL* program has a planner tool and this tool allows students to organize and share their ideas when they use the program (Bruce & Rubin, 1993). Computers can also be used as an outlining tool. Some programs, such as *ThinkTank*, can be used for outlining. Another program, *Write On! Plus: Middle School Writing Skills*, is an interactive CD-ROM that reinforces the writing process and skills through a collection of whole-language activities. During the prewriting phase, students are encouraged to brainstorm ideas; and list, cluster, and make outlines using such stimuli as excerpts from literature and prompts. During the writing segment, users explore different types of writing and point of views. In addition, they make some practices to improve their word processing and keyboarding skills. Students receive onscreen instruction and peer feedback in the editing phase (Daiute, 1985).

If students use such prewriting activities as concept maps, and outlines, they can break down the larger tasks into smaller ones. Many schools use Inspiration software as a graphic based flow-charting tool. Due to this program, students can organize maps, and define the relationships of the topics. If students use Inspiration software: They can make their outlines easily and use this outline as writing guides; they can work with pictures, video, audio, and voice recordings to get ideas down on paper; they can gain high motivation; and they can work with media and text (Castellani & Jeffs, 2001).

Eib and Cox (2003) investigated an action research about the Inspiration software. According to the authors, a middle level language arts teacher investigated the effects of technology-based prewriting activities on the quality of students' writing. "Her goal was for students to achieve increased proficiency in the organization strand of their writing and in computer use" (p. 54). She also wanted to increase students' participation in the writing process.

Students did several writing assignments using various Inspiration templates that the teacher created as prewriting tools. Twenty of her students' randomly selected writing samples were sent by her district to the Northwest Regional Educational Laboratory (NWREL) for scoring. She recorded each student's regular monthly writing scores and the writing scores for assignments using Inspiration for prewriting. The resulting data showed, "(a) increased proficiency in the organization strand of writing when students used Inspiration for prewriting, (b) …students consistently scored higher on writing assignments that began with an Inspiration prewriting activity and that they completed work more often" (Eib & Cox, 2003, p.55).

The computer can be used as a prompting instrument. Due to question prompts, writers can receive clarification similar to a conversational experience. "Computer programs typically include comments or prompts for the people who use the programs and special purpose programs can be written to give writers explicit prompts for prewriting" (Daiute. 1985, p. 82). Eliza is accepted as a classic example of a computer prompting program. Eliza asks and answers the questions to create speech like conversation (Daiute, 1985; Turkle, 1997). "Researchers who have used such automatic prompting for prewriting report that prompts stimulate writers' thinking and keep them on track with a topic" (Daiute, 1985, p. 87). MacArthur (1996) stated that a special writing program was developed by Salomon and this program provided guidance before, during, and after writing. MacArthur claimed that the quality of writing produced by students using this prompting program was improved.

Bonk and Reynolds (1992) made prewriting and revision prompts available for students. They found that these prompts did not result in better writing for the middle school students because they did not access the prompts very often. In this research, college students used modified programs. These kinds of programs contain prompts for writers. The authors found that college students who used modified programs produced better essays than the college students who did not use modified programs. This result shows that higher ability writers use prompts more often than the middle school students do, and take advantage of the opportunities given them.

Bahr, Nelson, and Meter (1996) compared the effects of two computer-based writing tools on the story-writing skills of fourth through eighth grade students with language-related learning disabilities. The first tool was *FrEdwriter*. The prompted writing feature of this program allowed students to answer story grammar questions. Then, the users typed stories by using those responses as they planned. The second program was *Once Upon a Time*. This program allowed students to create graphic scenes, and type stories about those scenes. Nine students attended the research for 11 weeks and used each tool for half of the writing sessions. Research results showed that students who had less internal organizational ability benefited from the computer-presented story grammar prompts and wrote less mature stories when using the graphics-based tool. Students with relatively strong organizational skills wrote more mature stories with the graphics-based tool. The researchers also found that many of the students were not familiar with revising strategies and had to be prompted to make specific changes throughout the course of the project. The researchers concluded that software was not the only factor to develop students' story writing skills. Teachers, peers, instructional strategies, and computer-based tools all together have some important roles to help students' story writing. The researchers suggested that writing teachers should develop their management strategies, and make a balance between time spent planning and time generating actual text.

Murray (1980) found that good writers spend about 85% of their on-task effort for prewriting, 2% for drafting, and 13% for revising. Average and lesser writers spend virtually no on-task effort at prewriting, only about 2% for revising, and 98% for drafting.

Davidson-Shivers, Nowlin, and Lanouette (2002) investigated the effects of learning styles and multimedia structure on undergraduate writing performance in a prewriting skills lesson. Forty-two students in an undergraduate composition course at a regional university in the Southeast participated in the study. There were approximately equal numbers of male and females with the majority (74%) of them being freshmen.
The multimedia lesson on brainstorming and outlining had two structures, fully prescribed and random.

The researchers administered questionnaires to collect data about demographics, students' attitudes toward computers, and their writing and computer skills. Results showed no significant difference in writing performance between the random and fully prescribed treatment groups. The researchers found that only 3% of the students had no prior experience on prewriting skills. On the other hand, majority of the students had three or more years experience on outlining and brainstorming. The researchers found an interesting result. At the time of the development of the lesson, instructors indicated that students did not use these prewriting skills while they were writing, but the majority of the students reported that they did. The researchers stated that the prewriting lesson might not be necessary for university students. These lessons can be more useful for lower level schooling or inexperienced writers than for advanced writers (Davidson-Shivers, Nowlin, & Lanouette, 2002).

Porcaro and Johnson (2003) wanted students to use graphic organizers during the prewriting phase. Students were also asked to bring the completed webs to the peer editing sessions. Researchers introduced different webs for students to help them organize their thoughts. In spite of this, many of the students had trouble understanding the web as an important part of the writing process. The authors gave students' ideas about the webs in their article. According to Jane, a student, webs did not help her because she did not know why she did the web. The researchers always reminded students to complete the webs first. After several weeks, the researchers made some progress. Some students understood why they were making webs. According to the authors, their biggest challenge was to convince students that the prewriting step of the writing process was critical.

In Strassman and D'Amore's (2002) article, students used electronic dialog to organize their topics. The second author provided students videotape and graphic organizers, and Venn diagram to help them organize their ideas. Also, she wanted students to write about the school uniforms. Students made their prewriting discussion by using electronic dialogue. After the electronic dialog, each student was given a printed copy of the dialogue. Students used these printouts to organize their topics. Each student cut, pasted, colored, and coded the printed dialogues to organize their thoughts. At the end of the activity, the online discussion became part of the writing process as a prewriting exercise.

III. COMPOSING

According to Daiute (1985), the composing process requires flexibility and speed to organize ideas. Word processors give writers more freedom than paper and pencil based writing because writers can compose text sequentially, follow an outline, or insert ideas at any point in a text. Writers can compose quickly on the computer and store the text for later changes. In addition, automatic insertion and editing commands can simplify the writers' task (Daiute, 1985).

Zeni (1990) stated that Joan Thomas, a teacher, began to give her eight graders word processor tutorial and some practice exercises requiring them to manipulate the cursor; do block movements; and add, delete, and replace text. In spite of this tutorial, when she wanted students to write a real paper, students behaved as if they had never touched a keyboard. Most of them decided to compose by hand. In the following year, she scrapped the tutorials and began with short, but original pieces of writing. Joan Thomas stated that there was no substitute for practice with real writing. Zeni (1990) believes that to help students complete meaningful texts even in a brief lab period, teachers should do some planning by hand, so that students can be ready to write in the lab.

Bruce and Peyton (1999) described an electronic communication software on a local area network to converse in writing. It is called *ENFI* (Electronic Networks for Interaction). This software was developed in 1985 by Trent Batson, Joy Kreeft Peyton, and English teachers at Gallaudet University. The software was developed for deaf students, classes for students learning English as a second language, and advanced rhetoric classes.

In *ENFI* classrooms, students and teachers have individual computer terminals and compose messages in a private window at the bottom of the screen. "When they press a key their message is immediately transmitted to all the screens in the class" (Bruce & Peyton, 1999, p. 2). Users' messages scroll up the screen in a continuous dialogue. Other students can see the name of the message sender on their screen. If participants miss the previous message they can scroll back to read them. The computer stores the entire discussion. Participants can print out the discussion and they can use different network channels. Discussion can occur between two participants or among the entire class. Teacher can see the writing of an individual or of a group student on a channel. In addition, when teacher make revisions other students can see this (Bruce & Peyton, 1999). According to the authors, ENFI has the following benefits:

1. ENFI would create new social dimensions in the writing classroom.
2. Students would write for authentic purposes and for real audiences.
3. Students would be immersed in a writing community.
4. Students would write collaboratively.
5. Students would write across the curriculum. (Bruce & Peyton, 1999, p. 5)

Hartley, Howe, and McKeachie (2001) studied the effects of new technology on writing by assessing whether or not people's writing styles and ways of thinking change when new technologies were introduced. The researchers compared three authors' materials that were written over a thirty-year period. During this time, there were great changes in the ways that they used technology to write. The research results indicated that the writing styles of each author was different. In addition, new technologies changed the authors' way to write. For example, in 1980's the authors used typewriter, but in 2000's they used word processors. In spite of this, new technologies did not change styles of the authors' products.

Hartley, Sotto, and Pennebaker (2003) conducted a similar study and found similar results. They studied the effects of new technology on writing by assessing whether or not an experienced writer's style of writing change when a new technology was introduced. In this research, the authors compared the 14 typed word-processed letters from Sotto (second author) to Hartrley (first author) with 14 dictated word-processed letters. Instead of keyboard, Sotto used voice-recognition system to write dictated letters. The researchers could not find any significant differences between the average letter lengths, numbers of paragraphs written, and number of sentences used in each group of letters. Nor were there any significant differences in terms of readability, or typographical and grammatical errors. The results indicated that using the voice-recognition software had only marginal effects upon the written products.

MacCann, Eatsment, and Pickering (2002) investigated 14 to 15 year old students' computer versus pen and paper writing. Computer group, and pen and paper group had 57 and 52 students, respectively. Students answered three essay questions from a 1997 external English test. In the second part of the study, students selected their preferred method of response. Eighty-eight students selected computer, and 53 students selected pen and paper to write. They answered two essays questions from a 1999 external English test. In the first part of

the study, essays were marked holistically. In the second part of the study, they were marked analytically. The authors summarized the results of the study as follows:

1- In marking essays, there is a tendency for the handwritten format to be favoured over the word-processed format. The typed version of the response simply appears to be physically shorter.
2- When the pen and paper responses were word-processed, markers tended to award higher marks to the handwritten scripts. There were no significant differences in their mean scores for four of the five essays (MacCann, Easment, & Pickering, 2002, p. 186-187).

Mioduser, Lahav, and Nachmias (2000) closely observed the spelling performance of a student with low vision before, during, and after working with the *Pupil Computer System*. The participant was an eighth grader. She was severely visually impaired and relied mainly on the auditory and tactile channels. For reading and writing purposes, she required character enlargement up to 5 cm from a working distance of 13 cm by means of a closed-circuit television (CCTV) in class and at home. She was unable to read from the blackboard, and her work in class was based on auditory information or printed materials that she read with a CCTV. She also did word processing by touch-typing. As her work advanced, she started to replicate the spelling by herself before and during the actual typing of the target word. As a result of the study, her spelling performance was improved. The computer tools had the central role in this improvement. The computer and software had positive impact on her study. She concluded: "The letters and the sounds helped me very much ... I would like to continue my work with the computer." (Mioduser, Lahav, & Nachmias, 2000, p. 23-24).

In MacArthur's (1999) research, students used *Write Outloud* word processor to compose. Three students participated to the study. These students had severe spelling problems. They wrote daily journals in their classroom, alternating among handwriting, word processing, and word prediction with speech synthesis. In the word prediction condition, students wrote by using *Write Outloud* word processor. This word processor has speech synthesis and uses standard Macintosh conventions for editing, saving, and loading text. Student journal entries were scored for total number of words, and proportions of legible and correctly spelled words. The researchers did not find differences among conditions for legibility, and only one student consistently spelled more words correctly in word prediction condition. According to the researcher, the word prediction software was difficult for students to use.

Gupta (1998) investigated how a group of non-proficient writers used the spelling checker while they were composing their essays on the computer. Sixteen ninth-grade students were selected for the study from a Singapore classroom. These students were observed over a period of two months. In the first month, students wrote composition by hand and in the second month, they composed on computers. The researcher found that students used the spelling checker for word-correction, and word-generation. The researcher concluded that the spelling checker was useful for students whose writing ability was poor, and whose writing was blocked by the mechanical aspects of writing.

Stanford and Siders (2001) described an e-mail pen pal correspondence project and its positive effect on the writing skills of students with and without disabilities. This study paired university teacher-education students with public school students for pen pal, e-pal, and control groups as follows: (a) Pen pal learners corresponded by handwritten, hard copy letters to the university students, (b) E-pal learners used e-mail through the Internet to communicate with these same preservice teachers, (c) control group participants wrote to an imaginary correspondent and realized no feedback from their communication. The researchers conducted the study using 80 students, in grades 6-8, who composed friendly letters twice a week for an eight-week period, and they measured 32 writing samples. One of the most important results of this study was the improvement of all students' writing when involving e-mail, as compared to traditional pen pal correspondence. Total words generated for students both with and without learning disabilities increased over the eight-week period for the e-mail groups.

Nichols (1996) compared compositions written by 38 sixth graders using pencil and paper with those written using a word processor. The subjects of this study were two classes of sixth-grade students from a private school in Maryland. Half of the students wrote a story using the traditional pencil-and-paper approach, and the other half used a word processor. One month later, students wrote a second story and changed the writing approach they used earlier. The researcher used *Correct Grammar* program to analyze data. This analysis provided information about number of sentences, number of words, and reading ease. The test results indicated no significant difference between the pencil-and-paper compositions and the word-processed compositions.

However, students using computers wrote compositions with more words and sentences than students who used pencil and paper.

In Rowley and Meyer's (2003) study, the Computer Tutor for Writers (CTW) software was tested and evaluated. CTW writing tasks include identifying a topic, developing a thesis statement, forming coherent sentences, revising the essay, etc. The CTW tested on 471 students. The study results revealed that the CTW improved students' ability to follow a complete writing process. The results also showed that students who used CTW learned more than their peers in traditional writing instruction.

Daniels (2004) investigated the motivational effects of computer technology on writing instruction and performance of 5th graders. Instructors' responses towards the questionnaires showed that students' motivation and writing length is increased when computers integrated into the writing process. The study results showed that computers, teacher participation, extra curricular instruction, and personalized assistance all together affected students' motivation.

In Holdich and Chung's (2003) study, the effects of the computer tutor, which is called HARRY, are analyzed. HARRY is a computer tutor for narrative writing. Three children wrote control and HARRY assisted stories. Children received conversational prompts from HARRY before, during, and after writing their compositions. A control group also wrote stories without receiving assistance. The results of the study showed that children who used HARRY wrote better stories. HARRY also helped children to cope with several writing tasks by presenting different aspects of the writing process when requested.

Bailey, O'Grady-Jones, and McGown (1995) measured the effect of the introduction of computer clip art and graphical presentation software on the writing process. The effect of using these visuals on length and quality of compositions, student motivation, students' ability to organize thoughts into paragraphs, and their reactions to sharing compositions was investigated. Twenty-five second grade students attended to the daily writer's workshops. These workshops included brainstorming, story webbing, drafting, editing, publishing, and presenting. Teacher and student informal interviews, observations, a final group debrief, and analyses of the final papers were the data collection methods. The results revealed that integration of visuals into the process affected the length and quality of compositions positively. In addition, graphical presentation software helped students stay on task, and organize their ideas. According to the authors, this study is an indication that presentation software can be used as an educational tool to support visual and text integration for young children.

Lindblom-Ylanne and Pihlajamaki (2003) investigated whether the computer supported learning environment enhances Law students' shared essay-writing process. Data were collected from 25 Law students. Interview results showed that students were divided into two groups. First group was very enthusiastic and enjoyed sharing their drafts with their peers. Second group, on the other hand, found sharing unfinished drafts too threatening. According to the course teacher, writing a critical essay fostered students' active participation in the learning process. The study results also showed that the active use of computer supported learning environment was related to good essay grades.

IV. REVISING AND EDITING

There is no doubt that computers can simplify the revising process. Delete, insert, and move commands allow writers to rearrange text without recopy it. Due to this easy revising, some writers never consider a paper to be finished. According to Armstrong and Casement (2000), on-screen revising is easier, but the quality of the writing and revision depends on the nature of the changes that are made. They believe that on-screen revision do not improve students' writing in terms of the logic of its structure or clarity of expression.

In the editing process, writers pay attention to details such as spelling and punctuation. Word processing programs, spelling checkers, on-line dictionaries, and on-line style and grammar manuals are useful in this process (Daiute, 1985).

Sadowski (1991) worked as a teacher in West Milwaukee schools, and integrated computers into the writing classroom. In three weeks period, students used different computer software to develop an essay for a literature class. Students typed, saved, and printed their work in the lab. Then, they used *Writer's Helper* and the *Revising Tools* to analyze and improve their essays. Teachers set a minimum of six options to be used from *Writer's Helper*. This program allowed students to outline their document, check for paragraph coherence, and analyze their sentence lengths or word frequencies. In addition, the audience menu allowed students to check their diction level, transitions, prepositions, references, and 'to be' verbs. According to the project results: (a) Revising Tools showed students sentence variation, word choice, transitions, topic sentence coherence, and

unity, (b) This program also showed students how these elements contribute to the overall readability, (c) Most of the students made editing easily on the computer, (d) Students helped each other to solve software related questions.

New (1999) observed the revision strategies of five students of French enrolled in one semester long intensive intermediate college French course. The participants completed a two-part writing task with the aid of the software program, *Systýme-D*. The program recorded the lexical, grammatical, and thematic information that students access while writing. The researcher analyzed the compositions, computer records, and videotapes of writing sessions. In addition to this, students responded a postwriting questionnaire. These questionnaires were analyzed to find how and when students revised their texts. According to the researcher, the surface-level revisions increased when students write on the computer. This study also revealed that both the self-reported good and poorer advanced intermediate writers did not revise substantially or spontaneously for meaning when writing in French.

Thorson (2000) also studied about the first and foreign language. In this study, the participants were students at the University of Arkansas at Little Rock enrolled in German classes at two different levels, an intermediate language course and an upper-level culture course. Students in each course were given four in-class writing assignments, two in English and two in German. They were expected to compose directly on the computer during the class time. When assigning the topics, attention was also given to genre. Two different tasks were assigned that required different genres, a letter to an Austrian pen pal, and a newspaper article dealing with course material. Students were expected to compose directly on the computer using the word processing program *J-Edit*. They were given 30 minutes to write the letters and 40 minutes to write the articles, and were allowed to use of a dictionary and in the case of the German culture course their textbook. The results of this study indicated that, (a) students tended to write less, but revised more when they composed in German, and (b) students tended to revise more in the English article than in the English letter. This result indicated that genre plays an important role in the first language writing, but its effects on foreign language writing remain unclear.

Figueredo and Varnhagen (2006) investigated whether spelling and grammar checkers distract students from making revisions, and whether students manage revision differently when they use checkers and dictionaries. Twenty-five freshman and 20 graduate students revised unfamiliar and erroneous essays, one essay on computer with spelling and grammar checkers and the other essay with a dictionary. The results showed that all students corrected more surface errors with the aid of spelling and grammar checkers than they corrected with the dictionary. The authors stated that because dictionary condition students could not enter the checkers, they had difficulty detecting the surface errors.

V. CONCLUSION

Computers can make writers' job easier in the writing process. In the prewriting phase, students can use computers effectively to plan their writing. If students use prewriting activities such as concept maps, and outlines, they can break down the larger tasks into smaller ones. Many schools use Inspiration software as a prewriting tool. Students prepare outlines and use them as a writing tool. Computers are very attractive for students. Due to this reason, they can spend so much time for prewriting activities. Teachers should develop their management strategies and make a balance between time spent for planning and time generating actual text. In the prewriting phase, the biggest challenge is to convince students about the usefulness of the prewriting step.

In this literature review, some research results showed that higher ability writers (college students) use prompts more often than middle school students use them, and take advantage of the opportunities given by software. The results also indicated that software should not be the only factor to develop students' writing skills. Teachers, peers, instructional strategies, and computer software all together have some important roles to help students.

In the composing phase, word processors can give writers more freedom than paper and pencil based writing because writers can compose text sequentially, follow an outline, or insert ideas at any point in a text. The review results showed that researchers could not find significant difference between the pencil-and–paper and word processed compositions. However, students become more prolific when they use computers in their writing.

Computers can simplify the revising process. Revising on the computer is easy, but quality of the revising depends on the nature of the changes that are made by students. In the editing process, writers pay attention to details such as spelling and punctuation. Word processing programs, spelling checkers, on-line dictionaries, on-line style and grammar manuals are useful for the editing. Students make most appropriate revising when they use online prompting and word processing.

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