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Computers, Revision, and ESL Writers: The Role of Experience

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Four advanced English as a Second Language (ESL) writers enrolled in a second-semester university composition class were observed while they used a computer to write and revise a paper on an assigned topic. The writers were selected for English proficiency (high vs. low) and computer writing experience (one semester vs. two or more semesters). Each student was videotaped for two sessions of writing and revising the paper. The tapes were transcribed and scored using an adaptation of the categories described by Faigley and Witte (1984). The results indicated that experience with the computer was a stronger factor than writing proficiency in determining computer writing strategies. The two inexperienced computer users spent less time revising, made more surface changes, and used the computer functions less than the experienced computer users. In posttaping interviews, the experienced users also showed a greater concern for content than did the inexperienced users, who indicated apprehension about using the computer and concern for correctness.

INTRODUCTION

Students at many schools now have the opportunity to use computers in their composition courses, often in central computer labs. In this case, a student may have the chance to write on a computer one semester, but not be able to continue with a computer-assisted composition class the next semester because of time or space limitations. Nevertheless, many instructors and researchers would agree that it takes more than 15 or 16 weeks for computers to affect the way students approach the writing process on a computer. This holds true as well for second language writers. They not only approach writing with the same trepidations held by native writers, but also must deal with language difficulties. Their ability to write in their second language as well as their experience in using a computer will affect the way they write on a computer. This article reports case

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studies of four English as a Second Language (ESL) writers with different levels of proficiency and computer experience as they write and revise an assigned essay using word processing.

Background

Although computers allow easy revision and rapid production of clean drafts and provide aids like a speller or a thesaurus, several researchers have found that basic writers and novice computer users often do not take advantage of the machine's capabilities. Although students may write longer texts, longer sentences, and spend more time actually writing (Gerrard, 1989), they also may first see the machine as a glorified typewriter (Strickland, 1989) or as a way to recopy their handwritten drafts (Cross, 1990). Daiute (1986) reported that the junior high students she studied revised differently on the computer than they did with pen and paper, mostly adding material at the end of a previous draft. Others have found that students may revise more at the word and sentence level on the computer (Bridwell, Sirc, & Brooke, 1985; Collier, 1983). Haas (1990) also found that students using a computer may plan less and use less conceptual, or high-level, planning.

Novice writers already tend to focus on lower level revision (Sommers, 1980), and the computer may exacerbate that tendency. Even experienced writers may make more substitutions and more surface-level changes on the computer (Lutz, 1987), although that result is not always replicated (Hill, Wallace, & Haas, 1991). Some writers may also shift their focus when writing on a computer, revising more in the early stages than in the later stages of text development or revising and reviewing less than they do with pen and paper (Van Waes, 1992). The restricted computer screen is more difficult to read than a paper copy (Haas, 1990) and may make it harder to think of the whole text.

If ESL writers have weak writing skills in their first language, they have little to transfer to their writing in the second. For these students, the computer merely adds another hurdle. Benesch (1987) reported that even ESL students who revise well with pen and paper may regress when they move to writing on a computer. They also take different approaches to the machine, using it to generate ideas, edit, and/or to become familiar with the technology (Benesch, 1987). Cross (1990) reports the case of one ESL student, a highly fluent multilingual, who "paid very little attention to his previous draft" (p. 52), preferring to start again at each session.

Some ESL students may tend to edit more than revise when they write by hand anyway, working on the sentence level (Raimes, 1985). In a later study, Raimes (1987) notes that although changes were almost evenly distributed between revisions and edits, the ESL students "stuck to whatever they had tentatively put on the page; they became locked into it, even if it seemed to lead down a blind alley" (p. 460). However, Hall (1990) observed that the pattern of revision for his subjects was similar for both first language and second language,

although the writers made more revisions and spent more time pondering revisions when writing in the second language. Language proficiency does not appear to affect revision strategies very much either (Raimes, 1987).

Although ESL writers may experience improved attitudes (Neu & Scarcella, 1991; Phinney & Mathis, 1990) and decreased apprehension when they write with computers (Phinney, 1991a, 1991b), there is little published evidence on how they write with computers or how their approach to writing might change with experience in using computers to write. Most studies of native student writers describe both novice writers and novice computer users. We might expect that familiarity with the machine and the software would lead to increased revision, a willingness to treat the text as more malleable, and increased use of writing aids like the speller or thesaurus. Ultimately, some users should become so comfortable that they can compose at least some of their text on the machine. This study was designed to examine what role language proficiency and computer experience would play in the computer writing processes of four ESL writers.

METHOD

Subjects

All students in the computer section of the second-semester ESL composition class were given a questionnaire and participation form near the end of the semester (see Appendix A). Four subjects were selected from those who returned the forms. Two students had had previous experience with writing on a computer; the other two had just begun to use a computer that semester. Of each pair, one student was considered to be a high-proficiency writer and the other a low-proficiency writer as determined by grades and evaluation of the instructor. All the subjects were native speakers of Spanish.

The second-semester ESL composition class stresses argumentation and research skills. Nonnative speakers may substitute the course for the equivalent English course, which is part of the general education requirements for all undergraduate degrees. One to two class hours per week were spent in the computer lab, which contained 50 IBM PCs on a LAN with AT servers. Students used *WordPerfect* version 5.1 to write; *Writer's Helper, Descant,* and *Mind Writer* were also available on the system. Students were also expected to use the computers outside of class.

Subject Profiles

Ramón came into the class as a weak writer. He was very insecure about his ability to express himself well in English, but he was a determined student. He rewrote his essays several times to obtain a higher score, but his revisions were mostly surface corrections. He was more concerned with form than content.

Ramón seldom did any prewriting. He wrote a rough draft and used that to write a final draft which was often nearly identical. He did little editing of any kind.

This class was Ramón's first exposure to computers. On his initial questionnaire, he said that he wrote his first drafts by hand and revised on the screen. He said he felt comfortable typing in English and liked writing with a computer very much, although he did not display that attitude in class. In fact, his classroom behavior appeared to be at odds with his answers to the questionnaire.

Edna, a fairly high-proficiency writer, also showed more concern for form than content. She never made substantive revisions in an essay and usually did not produce a rough draft. She edited only the punctuation in her text, saying that if she were to make her point, the punctuation must be correct. She felt that her content was very good and needed no improvement.

This class was Edna's first exposure to computers. She admitted at the beginning of the semester that she was afraid of computers. She initially avoided using them and it took 2 months before she decided to try to use the computer. On her questionnaire, she said she felt somewhat comfortable typing in English, but did not like writing on a computer very much.

Laura was a nervous, low-proficiency writer who said she had learned how to use a computer 6 years ago. She had also taken the computer-assisted section of the first semester course. She had never had any previous formal exposure to English. She was conscientious in rewriting each essay, to the point of having difficulty achieving closure. She was concerned with the quality of the essay but not necessarily with the grade. In this class she said that her main concern was content.

Laura used a computer at home as well as a typewriter. On her questionnaire, she indicated that she wrote and revised both on the computer and by hand. She felt somewhat comfortable typing in English and liked writing with a computer very much. She would try to help other students who were having trouble with the computer functions.

Jorge was a strong writer who began writing with a computer in the first-semester composition course. He rewrote essays when he felt they lacked content and did not seem to worry about the grade. He had difficulty with self-evaluation and finding content gaps in his own papers, but eventually succeeded in improving those areas. Jorge seldom did any formal prewriting.

Jorge was very comfortable with the computer and switched between Bank Street Writer, which he had used in the first-semester course, and WordPerfect. Once he realized that BSW was not used outside the university, he converted to WordPerfect. On his questionnaire, he indicated that he composed and revised on the screen and that he felt very comfortable typing in English and writing on the computer. Jorge would also help other students in the class.

Procedure

The subjects were given the writing topic, an argumentative essay on whether parents should restrict the amount of television their children watch (see Appendix B), 2 days prior to writing the first draft. They were told to think about the topic, do any prewriting they wished, and come prepared to write a draft on the topic. On the first day, students were told to write a draft in the computer lab using the same techniques they would use for any assignment. They were videotaped during this session, which was followed by a brief interview. They were given a hard copy of the draft and told to treat it as they would any other assignment. The second taping took place 7 days after the first session. An in-depth interview immediately followed the session, in which the students watched their revisions while explaining what they had done, including corrections, changes, and mistakes. All sessions were held in the last 3 weeks of the semester. Students were told they would receive extra credit for the essay they wrote. Because extra homework credit is often available for outside assignments, the offer did not seem to affect the way the students approached the task. The instructor said that the final essays were quite similar to other papers the students had produced. All hard copies and handwritten drafts were collected for analysis.

The videotapes were transcribed and coded using an adaptation of the system described by Faigley and Witte (1984), shown in Table 1. A few categories were added to facilitate the description of the computerized writing process, particularly *typographical correction* and *no change* in the formal changes category and categories for computer functions. An additional formal category, *grammar*, was necessary to accommodate the second language writing process, which often includes grammar changes not encompassed by tense, number, or modality. Revisions were also coded for length, following the system described by Bridwell (1980) as outlined by Faigley and Witte (1984). Bridwell's system is, as she points out, exhaustive, and includes categories which did not occur in these computer texts, such as *interlinear/marginal notations*. Faigley and Witte's system, with broader categories, is simpler to use and easier for raters to achieve consensus. Revisions were also marked for when they occurred: while the subject was composing on the computer, typing from a written draft, making planned revisions, making unplanned revisions, or changing from the written draft "on the fly" while typing.

Both authors coded all the transcripts. Initial agreement ranged from 45% to 66%, with 56% agreement overall. The major discrepancies stemmed from coding spelling corrections as opposed to typographical corrections. One scorer worked from both the videotape and the transcript; the other worked primarily from the transcript. This may have resulted in lower rates of agreement. It was

TABLE 1
Classifications of Types of Revisions and Actions

- **I. Surface Changes**
  - A. Formal Changes
    1. Spelling
    2. Tense, number, modality, word form
    3. Abbreviation, contraction
    4. Punctuation, capitalization
    5. Paragraph format
    6. Other format (spacing, indent, line length)
    7. Typographical correction
    8. Grammar
    9. No change resulting
  - B. Meaning-Preserving Changes
    1. Addition
    2. Deletion
    3. Substitution
    4. Permutation
    5. Distribution
    6. Consolidation
    7. No change resulting
- **II. Meaning Changes**
  - A. Microstructure Changes
    1. Addition
    2. Deletion
    3. Substitution
    4. Permutation
    5. Distribution
    6. Consolidation
  - B. Macrostructure Changes
    1. Addition
    2. Deletion
    3. Substitution
    4. Permutation
    5. Distribution
    6. Consolidation
- **III. Actions While Writing and Revising**
  - A. Source of Pauses
    1. Consult hard copy or written draft
    2. Read screen
    3. Point at screen
    4. Location of cursor
       a. Before morpheme boundary
       b. Before punctuation
       c. Before sentence or clause boundary
       d. Before paragraph
       e. Word internal
       f. Word boundary
       g. Other

(*continued*)

TABLE 1 (Continued)

- B. Computer Functions
  1. SAVE
  2. RETRIEVE
  3. BLOCK
  4. MOVE
  5. SPELL CHECK
  6. THESAURUS
  7. MOVE CURSOR

IV. Length of Changes
- A. Graphical Change
- B. Lexical Change
- C. Phrasal Change
- D. Clausal Change
- E. Sentence Change
- F. Multisentence Change

sometimes easier to determine spelling corrections versus typos on the videotape. Because the coding involved so many categories, traditional reliability estimates are impossible to determine. Conflicts in coding were resolved by consensus. Assignment of a change to either category was based on the coders' knowledge of the students' first language, knowledge of arrangement of the keyboard, and a comparison of the text before and after the change. For example, Laura began to type "eja," then backspaced and replaced the *j* with an *x*. Because the word for *example* in Spanish is *ejemplo*, this was scored as a spelling correction. A typographical correction would include typing adjacent letters in error, that is, *s* for *a*, or reversing letters, like typing *teh* for *the*.

We also scored the intent rather than the step-by-step protocol. On a keystroke protocol, there is no such thing as a substitution, unless the writer uses the "typeover" function, or a permutation. Substitutions were most commonly keyed as a deletion plus an insertion; permutations usually appeared as a deletion followed by a cursor movement and an insertion of similar text elsewhere. These combinations of keystrokes were scored as single changes to preserve the apparent intent of the writer.

The tapes were also timed for the periods spent composing, typing, and revising. Pauses of 2 seconds or longer were also timed and coded for where they occurred in the text and what that student appeared to be doing during the pause.

RESULTS

Description of Writing Sessions

Ramón began his first session by entering his name, class, and a long title. He spent the rest of his session composing his draft on the computer. He did not appear to have done any prewriting. Out of the 48 minutes in the first session, he

spent approximately 3½ minutes in local revisions at various points in the text. It was clear that Ramón was uncomfortable with composing on the machine, and he spent much of his time editing minor typographical changes while he composed. Ramón came in for the second session with a handwritten draft. He proceeded to block delete all of his first draft in sections and type in his new draft. At the end of the 57 minute session, he spent 7½ minutes reading his text on the screen and making minor editing changes. Ramón's final draft is shown in Appendix D.

Edna began her first session by typing the topic, which she subsequently deleted. She then took out her notebook and wrote her first draft by hand. This draft showed almost no corrections or changes. She then typed in the draft. When she reached the end of her handwritten text, she tried to continue composing on the machine, but ultimately deleted the two sentences she had written. In her second session, lasting 20 minutes, she moved four sentences and typed in three additional sentences she had written at home.

Laura came into the first session with a prewriting cluster which she used as a basis for her draft, which she wrote by hand. She then typed in her draft with a few revisions. Her second session was spent making revisions, editing, and using the speller and thesaurus.

Jorge was the only student who was comfortable composing on the computer. He did no prewriting. In his first session, Jorge alternated between composing and revising; he would finish a paragraph or two, then revise and edit what he had written. He was the only subject who spent a substantial amount of time revising in the first session. The second session was spent entirely in revision; after he had completed the revisions indicated on his hard copy, he continued to make new changes.

Time On Task

The amount and relative percentage of time each student was engaged in different writing activities across both sessions is shown in Table 2. Ramón, who spent both sessions either composing or typing, spent very little time (10.7%) revising or editing. The other novice user, Edna, revised somewhat more but was heavily dependent on her handwritten text. The 2½ minutes of machine composing was spent on two sentences which she finally deleted. Edna also spent the least amount of time on the computer.

Of the two experienced users, Laura also spent much of her time in the first session writing a draft by hand, which she then typed in. However, she spent somewhat more time revising and spent almost as much time using the spelling checker and thesaurus to edit her text. Jorge, the most proficient of the four students, spent much less time composing and almost half his time revising. All four students spent about the same amount of time pausing, about 30%.

To determine significant differences between students, a test of significance

TABLE 2
Minutes (and Percentage of Total) Spent in Writing/Revising Activities

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Composing (machine)	25:21 (24.4%)	2:28 (3.1%)	0:00	26:19 (22.4%)
Composing (hand)	0:00	19:47 (25.1%)	27:35 (23.6%)	0:00
Typing From Draft	35:03 (33.7%)	23:48 (30.4%)	23:51 (20.3%)	0:00
Revising/Editing	11:06[a] (10.7%)	8:06 (10.3%)	15:46[a,b] (13.5%)	55:30[b] (47.1%)
Computer Functions	0:00	0:00	15:08 (12.9%)	1:34 (1.3%)
Pausing	32:29[c] (31.2%)	25:29[d] (32.3%)	34:45 (29.7%)	34:20[c,d] (29.2%)
Total	103:59	78:38	117:05	117:43

Note. Superscript letters signify pairs of results whose differences are significant.
[a,b,d]Difference of proportion of pairs significant at $p < .001$.
[c]Difference of proportion of pairs significant at $p < .02$.

of difference of proportion was used, measuring the number of changes over the total number. This test results in a z score which estimates the probability that the two proportions are the same.

Ramón and Edna did not differ significantly in the percentage of time they spent in revision and editing ($z = 0.68$). However, the percentage of time Laura spent in revision was significantly greater than Ramón and Edna ($z = 4.92$, $p < .001$), as was the time Jorge spent in revision compared to Laura ($z = 35.51$, $p < .001$). Jorge spent proportionately less time pausing than did Ramón ($z = 2.51$, $p < .02$) or Edna ($z = 3.59$, $p < .001$).

Table 3 shows the number per hundred words and percentage of the total revisions by the context: composing directly on the computer, typing directly from a draft, or revising. The revisions are divided into changes made while typing that were different from the draft, unplanned revisions made during a revision session, and planned revisions based on hardcopy corrections. Both the novice users, Ramón and Edna, made over half their revisions as corrections while typing or composing. Both made a reasonable percentage of changes from their written drafts, although the two experienced users, Jorge and Laura, made many more. Ramón made significantly fewer unplanned revisions than Laura (z

TABLE 3
Context of Revisions

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Composing (machine)	74[a,b] (35.1%)	21 (21.6%)	4[a] (2.2%)	68[b] (17.4%)
Typing From Draft	64 (30.3%)	31 (32%)	59 (32.1%)	0
Changes on Draft While Typing	36 (18.5%)	15 (15.5%)	23 (12.5%)	0
Revisions During Typing	27[c] (12.8%)	21 (21.6%)	70[c,d] (38%)	246[d] (63.1%)
Planned Revisions	10 (4.7%)	9 (9.3%)	28 15.2%)	76 (19.5%)
Total Revisions	211	97	184	390
Total Words	702	487	635	510

Note. Superscript letters signify pairs of results whose differences are significant.
[a,d]Difference of proportion of pairs significant at $p < .001$.
[b]Difference of proportion of pairs significant at $p < .02$.
[c]Difference of proportion of pairs significant at $p < .01$.

$= 2.87$, $p < .005$), whereas Jorge made more unplanned revisions than any of the others, including Laura ($z = 4.24$, $p < .001$). Planned revisions, as measured by written changes on the hard copies, accounted for less than 10% of the changes among the novice users. This indicates that both Ramón and Edna did not plan extensive revisions, which was typical of their writing strategies. Ramón also showed a higher percentage of revisions while composing than Laura ($z = 3.67$, $p < .001$) or Jorge ($z = 2.29$, $p < .02$), which seemed to be linked to his tendency to edit prematurely.

The experienced users, Laura and Jorge, made many more revisions, both planned and unplanned. This again was typical of the way they approached the writing task. Both students seemed willing to continue revising after they had completed their planned changes, and they both spent most of their second session in revision, unlike Ramón and Edna. Of course, Jorge shows no revisions during typing or revisions from a draft because he did not produce a handwritten draft.

Table 4 shows the number per hundred words and percentage of the total changes by length. The majority of changes were at the word or graphic level. This tallies with the results reported by Bridwell et al. (1985), which showed a substantial increase in surface-level revisions when writing on a computer, which

TABLE 4
Revisions per 100 Words (and Percentage) by Length

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Graphic	17.24 (57.3%)	14.17 (71.1%)	14.02 (48.4%)	32.35 (42.3%)
Word	6.13 (21.8%)	2.46 (12.4%)	11.02 (38.0%)	27.25 (35.6%)
Phrase	4.99 (15.1%)	1.44 (7.2%)	3.15 (10.9%)	14.31 (18.7%)
Clause	1.00 (3.3%)	0.62 (3.1%)	0.31 (1.1%)	1.96 (2.6%)
Sentence	0.28 (0.9%)	0.82 (4.1%)	0.47 (1.6%)	0.59 (0.6%)
Multisentence	0.43 (1.4%)	0.41 (2.1%)	0	0
Total	211	97	184	390
Total Words	702	487	635	510

is what one would expect, because even good typists tend to make many typographical corrections. However, it is clear that all four students tended to make mostly local changes, with the two experienced users making more word-level changes. Only Jorge made a sizable number of phrase- and clause-level changes. Ramón's three multisentence changes reflect the deletion of his first draft; Edna's two changes represent three sentences added from her draft in each session. All four students tended to keep the overall structure of the text as it was in the first draft.

Table 5 shows the number per hundred words and percentage of the total changes for the different types of revision. Again, Jorge looks different from the others; he tended to make more meaning-preserving and microstructure changes. Ramón, Edna, and Laura all made more formal changes than any other kind. This indicates that regardless of proficiency or experience, these writers tended to focus on local revisions and avoid, to a great extent, macrostructure revisions, or revisions that affect the summary of the text (Faigley & Witte, 1981). Jorge shows more variety, but even he does not show many macrostructure revisions.

This pattern is borne out if we look at the breakdown of the different types of changes. Formal revisions were concentrated in spelling changes, tense/number/modal changes, punctuation and capitalization, typographical corrections, and

TABLE 5
Number (and Percentage) of Revisions by Type

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Formal	17.66 (58.8%)	14.17 (71.1%)	18.11 (62.5%)	31.76 (41.5%)
Meaning-Preserving	9.97 (33.2%)	3.49 (17.5%)	7.72 (26.6%)	32.55 (42.6%)
Microstructure	1.57 (5.2%)	.62 (3.1%)	2.68 (9.2%)	10.78 (14.1%)
Macrostructure	0.85 (2.8%)	1.64 (8.2%)	0.47 (1.6%)	1.37 (1.8%)
Total	211	97	184	390
Total words	702	487	635	510

format changes (primarily spacing changes). All the students made some grammatical changes, primarily changing prepositions. Meaning-preserving changes consisted of additions, deletions, and substitutions, with some permutations by Jorge and Ramón. Meaning changes followed a similar pattern (see Appendix C for full breakdown).

Table 6 shows the frequency that each student used various computer functions. Both the novice users used the BLOCK command to make macrostructure changes: Ramón to delete his first draft, Edna to move three sentences. However, Edna said in her postrevision interview that she did not normally use the BLOCK command, but would delete the sentence with the delete key and retype it in the new location. She only used BLOCK because she was being videotaped. The two experienced users used the spelling checker. Laura used the thesaurus heavily to find replacements for "simple words" and to check the

TABLE 6
Use of Computer Function

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
SAVE	4	2	3	13
BLOCK	4	3	0	0
MOVE	0	2	0	0
SPELL	0	0	2	4
THES	1	0	24	0
CURSOR	56	31	57	258

TABLE 7
Number and Mean Length of Pauses (in seconds) by Source

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Reading Hard Copy	0	6 (37.0)	13 (26.9)	3 (10.7)
Reading Screen	14 (32.3)	12 (21.5)	26 (28.7)	33 (21.7)
Before Punctuation	25 (10.0)	16 (3.6)	8 (5.1)	14 (6.9)
Before Sentence/Clause Boundary	29 (7.2)	33 (6.2)	7 (4.0)	18 (9.8)
Before Paragraph	25 (11.6)	2 (8.0)	5 (7.4)	6 (10.3)
Word Internal	21 (3.5)	14 (3.9)	34 (3.8)	6 (4.2)
Word Boundary	168 (5.8)	69 (4.9)	58 (5.7)	79 (6.1)
Other	22 (7.0)	45 (7.4)	48 (8.9)	64 (7.0)
Total	284 (8.5)	197 (7.5)	199 (10.5)	223 (9.1)

meaning of the words she had used. Jorge said he was unaware that WordPerfect had a thesaurus, but he used the spelling checker to check vocabulary.

Table 7 shows the number and mean length of pauses for each student. Both experienced writers referred to the screen almost twice as many times as the novice writers. They both also paused less at sentence and clause boundaries than the novice writers. The two low-proficiency writers also tended to stop more within words, perhaps as they decided on spelling. All students tended to pause longer while reading than while rewriting or typing.

Interviews

In the postrevision interviews, students were asked about their writing processes and their use of the computer. Both novice users indicated that they were still uncomfortable with the computer. Ramón said, "It's easier to write on a piece of paper," and that he put his text into the computer "when everything is correct" on the written copy. He felt that he tended to lose sight of his ideas when he tried to compose on the machine. Both Ramón and Edna said they used the computer "just for typing" or "as a typewriter." However, Ramón was willing to use the

thesaurus to "check the words," whereas Edna would rather use a dictionary or a paperback thesaurus. Ramón also was more willing to change his text as he typed, saying several times that he would read what he was typing and when "it sounds better in the way of writing, that I change." Edna said she tried not to use a lot of functions on the computer because she was afraid she "would erase what I did or mess it up or something." Edna clearly was concerned about who (or what) was in control of her text; in her first interview, she said, "Composing on the computer bothers me and I have to stop. I don't have any control over the computer. I have control over my handwriting."

Unlike Ramón and Edna, both Jorge and Laura spoke at length about their concerns for content. Jorge said of his first draft, "Some of the ideas weren't placed in the right order.... I changed some words because they were able to express the idea better." Laura said, "First, I think story.... The introduction I look [at] to give previous information that can give the person who's reading the paper an idea of what I am going to do.... then I just try to cover ideas with each paragraph." Both said they felt comfortable reading their text on the screen and both said they did a lot of screen reviewing, which is substantiated by the number of pauses each made while reading the screen. Both also felt comfortable with editing on a hard copy and revising on screen. Laura's and Jorge's hard copies were well-marked; Ramón and Edna made very few revisions on their hard copies.

CONCLUSION

In this study, language proficiency seemed to be less of a factor than computer experience in differentiating how the students wrote on the computer, although Jorge's advanced proficiency coupled with his computer experience resulted in a distinctive writing profile. Both novice users used the computer as a high-tech typewriter, good for producing clean copy and making corrections, but they did not take advantage of its capabilities for extensive revision. Ramón, who tended to edit prematurely, spent most of his time staring at the screen and correcting typographical errors. Edna's reluctance to use the computer, coupled with her attitudes towards writing in English, meant that she revised least, a pattern she followed when writing by hand, and used the computer as little as possible. Both novice users appeared to make few changes in the way they wrote when they used the computer.

Laura had adapted to the computer well. She still depended on her handwritten draft, but appeared comfortable going from hard copy to screen. Jorge, on the other hand, was the most comfortable at the computer, and showed the kind of profile we might expect from an experienced computer user. For Jorge, first and final draft are no longer separate. He used the hard copy as a stimulus for revision and continued to revise on the screen until he was satisfied.

For Laura and Jorge, experience in using the computer to write seemed to help them spend more time revising and to continue revising after planned changes had been made. They also were more willing to use the speller and thesaurus and had developed individual strategies to use the information these aids provided, whereas neither Ramón nor Edna used the speller or thesaurus to edit or revise their text.

If the results are compared to previous studies, the inexperienced users seem to be comparable to other users. Ramón and Edna, for example, show similar patterns of changes by length as those reported by Bridwell et al. (1985). Jorge again stands out as making far more changes than any of the subjects reported in that study. All of the students made many more formal changes, particularly in spelling, grammar, and format, than those reported in Faigley and Witte (1981), whose subjects were writing by hand. This pattern duplicates results of other studies of computer writers (Bridwell et al., 1985).

As second language writers, the four students show typical negative writing behaviors—premature editing, avoidance behavior, a concern with form over substance—as well as positive behaviors. The computer did not seem to affect the way these students approached the writing process in English, with the possible exception of Jorge. A major gap in much ESL composition research, including this study, is the lack of information about the students' writing processes in their first language. In our program, as in many, composition in the first language is an optional upper-division course. We are thus trying to help students acquire new working patterns in their second language without support from their first language. If we are to continue to see computer-mediated composition as a medium for changing and facilitating the writing process, considerable more research, including long-term observation, is needed on the relationship between the way students approach writing in their first and second languages, both by hand and on computer.

Admittedly, four students is too small a sample to draw many general conclusions. The kind of detailed profiles possible in such case studies can give a picture of the strategies different ESL students use while writing on the computer. These case studies do suggest that teachers be aware of different adaptation patterns in computer use. For these students, however, it is clear that a single semester is not sufficient to help them use the computer to its full advantage to revise their writing. The results underscore the need for early and continued exposure to writing on computers if we expect our students to adapt their strategies to writing on the computer in English.

REFERENCES

Benesch, S. (1987, March). *Word processing in English as a second language: A case study of three non-native college students*. Paper presented at Conference on College Composition and Communication, Atlanta, GA. (ERIC Document Reproduction Service No. ED 281 383)

Bridwell, L. (1980). Revising strategies in twelfth grade students' transactional writing. *Research in the Teaching of English, 14*, 197–222.

Bridwell, L., Sirc, G., & Brooke, R. (1985). Revising and computing: Case studies of student writers. In S. Freedman (Ed.), *The acquisition of written language: Revision and response* (pp. 172–194). Norwood, NJ: Ablex.

Collier, R.M. (1983). *The effect of a computer-based text-editor on the creativity and writing skills of community college composition students: A pilot project.* (ERIC Document Reproduction Service No. ED 246 430)

Cross, G. (1990). Left to their own devices: Three basic writers using word processing. *Computers and Composition, 7*(2), 47–58.

Daiute, C. (1986). Physical and cognitive factors in revising: Insights from studies with computers. *Research in the Teaching of English, 20*, 141–159.

Faigley, L., & Witte, S.P. (1981). Analyzing revision. *College Composition and Communication, 32*, 400–414.

Faigley, L., & Witte, S.P. (1984). Measuring the effects of revisions on text structure. In R. Beach & L.S. Bridwell (Eds.), *New directions in composition research* (pp. 95–108). New York: Guilford Press.

Gerrard, L. (1989). *Writing at century's end: Essays in computer-assisted composition.* New York: McGraw-Hill.

Haas, C. (1990). How the writing medium shapes the writing process: Effects of word processing on planning. *Research in the Teaching of English, 23*, 181–207.

Hall, C. (1990). Managing the complexity of revising across languages. *TESOL Quarterly, 24*, 43–60.

Hill, C.A., Wallace, D.L., & Haas, C. (1991). Revising on-line: Computer technologies and the revising process. *Computers and Composition, 9*(1), 83–109.

Lutz, J.A. (1987). A study of professional and experienced writers revising and editing at the computer and with pen and paper. *Research in the Teaching of English, 21*, 398–421.

Neu, J., & Scarcella, R. (1991). Word processing in the ESL writing classroom: A survey of student attitudes. In P. Dunkel (Ed.), *Computer-assisted language learning and testing: Research issues and practice* (pp. 169–187). Boston: Heinle & Heinle.

Phinney, M. (1991a). Computer-assisted writing and writing apprehension in ESL students. In P. Dunkel (Ed.), *Computer-assisted language learning and testing: Research issues and practice* (pp. 189–204). Boston: Heinle & Heinle.

Phinney, M. (1991b). Word processing and writing apprehension in first and second language writers. *Computers and Composition, 9*(1), 65–82.

Phinney, M., & Mathis, C. (1990). ESL student responses to writing with computers. *TESOL Newsletter, 24*(2), 30–31.

Raimes, A. (1985). What unskilled ESL students do as they write: A classroom study of composing. *TESOL Quarterly, 19*, 229–258.

Raimes, A. (1987). Language proficiency, writing ability, and composing strategies: A study of ESL college student writers. *Language Learning, 37*, 439–467.

Sommers, N. (1980). Revising strategies of student writers and experienced adult writers. *College Composition and Communication, 31*, 378–388.

Strickland, J. (1989). How the student writer adapts to computers: A first-year student protocol. *Computers and Composition, 6*(2), 7–22.

Van Waes, L. (1992, May). *Writing profiles of computer writers.* Paper presented at the Computers and Writing Conference, Indianapolis, IN.

APPENDIX A

Information Questionnaire

The Department of Languages and Linguistics is conducting a research project on how students write using a computer. Please fill out the following information to help us find appropriate subjects.

Name _____ ID _____

Major _____ Year at UTEP: [ ] Fresh [ ] Soph [ ] Jr [ ] Sr

Is this the first semester you have used a computer to write? [ ] Yes [ ] No

If you answered No:

When did you first use a computer to write?_____

Did you learn to use a computer [ ] in class [ ] on your own

Do you use a computer to write in your native language? [ ] Yes [ ] No

When you write your papers for class:

Do you write your first drafts:	[ ] on the computer	[ ] by hand
Do you revise your paper:	[ ] on the screen	[ ] on paper
Do you feel comfortable typing in English?	[ ] very much	[ ] somewhat
	[ ] not much	[ ] not at all
Do you like writing with a computer?	[ ] very much	[ ] somewhat
	[ ] not very much	[ ] not at all

If you wish to participate in this project, you will be asked to write a paper and revise it. We will videotape you while you are writing and talk to you about the writing after each session. You will get extra credit in your ESOL course for the paper you write.

If you are interested in participating in this project, please sign below.

APPENDIX B

Topic

A recent article in the *El Paso Times* stated that the average child watches TV three to four hours a day. By age 18, students have spent 11,000 hours in school and 20,000 hours watching TV. Write an essay stating your position on whether or not parents should restrict their children's TV viewing, presenting examples that will support your point of view.

APPENDIX C

TABLE C-1
Breakdown of Formal Changes

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Spelling	14	4	44	20
Tense/Number/Modal	11	9	16	26
Abbreviation	1	1	0	1
Punctuation/Capitalization	24	19	8	34
Paragraph Format	2	0	0	1
Other Format	17	9	4	19
Typography	41	8	33	40
Grammar	5	9	4	13
No Change	9	10	6	8
Total Changes	124	69	115	162
Total Words	702	487	635	510

TABLE C-2
Breakdown of Meaning-Preserving Changes

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Additions	38	5	20	44
Deletions	14	6	6	50
Substitutions	14	5	29	54
Permutations	3	0	0	16
Distributions	0	0	0	0
Consolidations	0	1	0	1
No Change	0	0	0	1
Total Changes	66	17	55	166
Total Words	702	487	635	510

TABLE C-3
Breakdown of Meaning Changes

	Ramón	Edna	Laura	Jorge
	Novice/Low	Novice/High	Exper./Low	Exper./High
Additions	6	3	9	29
Deletions	3	3	2	17
Substitutions	4	1	9	12
Permutations	1	4	0	0
Distributions	0	0	0	0
Consolidations	0	0	0	0
Total Changes	14	11	20	64
Total Words	702	487	635	510

APPENDIX D

Final Draft for Ramón

TELEVISION LIKE A MEAN OF COMMUNICATION THAT PRODUCES A GREAT LEVEL OF INFLUENCE OVER PEOPLE.

The television is considered by experts as one of the means of communication that deliberates more distractions and influences over people, who are continiously watching television programming which is being offered to public audience, considering it sometimes like a way of relaxation and distraction for a quite mind and a relax body. The rate of influence ejerced over people sometimes is so large that people which is watching t.v. prefers to continue be watching it that to make another thing which is being included like a part of the activities of the person programming for the day. That is the reason why the children are enagenated with the excesive use of television.

Television presents the largest rate of audience competing with the radio, newspapers and magazines which are being located under the rate of audience that the television posses actually.

Television has the largest amount of audience deposited over the youth people, counting with the largest rate of average, children audience, who spends a lot of time in front of t.v. enjoying the set of programs that are offered to them specially, mainly like a way of distraction and relaxation, but also as a way to learn good modals, good customs or new things daily.

The other part that supports the amount of audience also,is the adolescent people which is between 12 and 18 years old, who spends most of their leisure time watching television, using it like a way to rest of the tensions of the day, but also in a exagerate proportion.

The excesive use of t.v. could it be bad for the structure of person, who is leasuring a lot of time in a day watching t.v. and leaving pendents of other important things by cause of the great influence that produce the vice of t.v..

The influence of television is sometimes emotional making that facts occured in the programs make a remarkable level of influence over dramatic and sentimental life in a person.

Everything that is not made well measured is bad or perjudicial, that is the reason why children spends less number of hours in school than watching the television programming, causing these facts problems as: Low averages in school, leisure of time that it could be use to do better things that to be hours and hours watching the t.v., leaving pendants assignments or works that are be forecast for a determinated day.

Parents who are living this problem with their children, they would take care of them restricting their children's viewing to a regular schedule, avoiding them to be leasuring great part of the day watching t.v., giving them opportunity to

watch t.v. only at specific hours, after lunch like a rest and in the night after have done all the activities, assignments and homeworks determinated for that day.

Parents should take care of their children teaching them how to study, how to work to be a future person, how to practice sports to be health, do not use drugs, so they could it reach a comfortable future life without problems of unemployment, ignorance and bad health for the rest of their lives.

Parents should educate their children with good habits, modals and good principles to build a progressive future full of satisfaction and proud for a better way of living.

Spending time watching t.v. it could be considered like a way of emotional distraction for many people that knows how to spend their time not wasting it and not leaving important things without to do just only because of the great level of influence that it could create the television over people.

Parents should eliminate the wasting time of their children making them to do usual things that keeps busy their body and minds, it could be studying, practicing any sport, helping at home, or working out of home like a benefit for them in a closer future. so, in this way, parents should restrict their children's t.v. viewing to eliminate the mad that produce the excessive use of television over people.