

Automated Text-checkers:
A Chronology and a Bibliography of Commentary
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Text-checkers—computerized spell-checkers, grammar-checkers, and style-checkers—have been around for three decades. The programs compare words in a textfile against a vocabulary of conventional spellings, generate the rate of passive constructions and raise a red flag if the rate is too high, question clichés and idiomatic expressions, capitalize the next word after a full stop, calculate “readability” formulas, and perform a host of other operations. Currently, integrated into all the popular word-processing and email packages, text-checkers are endemic to digital composing. Usually they function willy nilly, unless the writer has the initiative and know-how to turn them off.

What has been the composition community’s reaction to this now pervasive—some would say invasive—machinery? Individually, the response varies. Bob Broad records one teacher apparently evaluating a student’s spelling errors more harshly because the student’s class met in a computer classroom: “Do they use spell check?” Yet another of his teachers excuses a student who had misspelled a proper name because “the spell-checker’s not going to pick that up, so I gave him a little leeway there” (*What We Really Value: Beyond Rubrics in Teaching and Assessing Writing*, Utah State University Press, 2003, p. 115). Collectively, it is hard to say how the writing-teacher community has dealt with the encroachment of text-checkers over the years into their evaluation

procedures and other teaching practices. There is no substantial review of the literature.

For some baseline information to help answer the question I have put together a chronology of the technology of text-checkers along with a bibliography of substantive commentary on them. I have sorted the history of the technology and the history of the commentary year by year, better to see patterns and interrelationships. My time-line bibliography is intended for the use especially of writing teachers and writing scholars—across the academic disciplines and in the workplace—and is offered with the hope that informed critique of this particular piece of auto-instructional technology will continue. An alphabetical list of the 349 items is available at <http://comppile.tamucc.edu/textcheckerAlphaList.pdf>.

In gathering and organizing the material, however, I observed three curiosities that I can’t resist passing on. The first has to do with the accuracy of the text-checking programs. Fairly early in their history the imperfect performance of text-checkers was noted (e.g., Frase, 1981; Sommers, 1982). Spell-checkers are more accurate than grammar-checkers, of course. But in either case, the rate of inaccuracy is not minimal. Using student writing, Collins (1989) and Brock (1993) compared non-spelling mistakes detected by the most popular programs (Sensible Grammar, RightWriter, Grammatik, etc.) with those detected by writing teachers, and found machines and teachers identifying the same mistakes less than 10% of the time. It can be argued that the detection of any amount of error in a student’s writing is a bonus for the student, but that disregards the times the programs identify correct forms as incorrect. Typically false positives or “false flags” will make up 30% to 40% of the instances the software will identify as error. What I find remarkable is not the weak performance of the software but the fact that this inaccuracy has been reported for twenty-five years now and little seems to have come of it. Software designers don’t improve their products, and teachers don’t seem to mind

students using them. Bruce Wampler, who spent seven years improving his grammar-checker program, Grammatik, before selling it to WordPerfect in 1992, remarked in 2002 that he believed WordPerfect had made no changes in the code since then (Kies 2005). Kathleen Kiefer, who helped develop Writer's Workbench in the early 1980s, argues that it is still more accurate than the most recent versions of Microsoft Word (cited in Mike Palmquist, "Tracing the Development of Digital Tools for Writers and Writing Teachers," forthcoming in Ollie Olviedo, Joyce R. Walker, and Byron Hawk (Eds.), *Digital Tools in Composition Studies: Critical Dimensions and Implication*, Hampton Press, forthcoming).

The comments by Wampler and Kiefer connect with a second curiosity, which involves what might be called the commodification of the technology. Roughly the text-checking capability moved from a mainframe "general inquirer" method with an embedded vocabulary and text processed via punchcards (1950's-1960's); to line-editors still connected to mainframe computers processing fixed-line text connected to a typewriter, a TV screen, or CRT display (1970's); to stand-alone programs that could analyze text via external disks connected to a personal computer (1980's); to bonus features of word-processing software packages that could be installed and activated if one wished to vet a text (1990's); to default features of word-processing programs that run constantly ("auto-correct") unless the user chooses to deactivate them (mid-1990's). In short the commodity has moved from self-controlled to automatic, from manifest to hidden. Parallel to this movement is the shift from freeware and shareware programs to corporate owned products. Les Earnest, for instance, recounts how he and graduate students devised one of the first spelling checkers, which spread through ARPANET in the early 1970s, years before commercial products became ubiquitous (Earnest, 1991).

The curiosity is that scholars researching text-checkers seem to have bought into this process of commodity naturalization. The bulk of their critique has focused on the earlier stand-alone programs with little of it investigating the later integrated word-processing packages. Wampler himself notes the decline in critique, and argues that the decision to use a plug-in product was an "active choice," and that "since grammar checking has become a standard feature of word-processing, this self-filtering is gone" (Wampler 1995). The opposite could be argued, however. Maybe users did not lose some control of text-checking but gained it. With the integrated word-processing software, writers could apply text-checking on the fly, whenever in the act of composing they wanted it. Early on the crucial shift was expressed in Bryan Pfaffenberger's piece for *Research in Word Processing Newsletter*, "Integrated Word Processing: Has it Arrived?" (1987), in which he fantasized his "exemplary writing tool: the green box on your screen is not merely a space in which to write; it's also a gateway to a world of writing accessories, all of which are available at a keystroke," including "a context-sensitive style guide." Five years later, in 1992, he had his exemplary tool when Microsoft Word 5.0 included a grammar-checker. Many users quickly learned not to install it since occupied about half of the program's memory partition, but industry soon solved that problem with improved memory chips. More and more the capability was built into the users' own machines. Critique of the programs may have faded the more they were "owned" by their purchasers.

Whatever the causes, they are related to the third curiosity, which is the overall decline of scholarship on text-checkers in the last ten years. I don't pretend that the following bibliography is complete, but I searched rather evenly over the years. Beginning with 1980 (the year after the release of WordStar as the first word-processing software including a spell-checker) and proceeding by two-year increments, here are the number of items.

1982-1983	40
1984-1985	66
1986-1987	53
1988-1989	40
1990-1991	34
1992-1993	36
1994-1995	13
1996-1997	15
1998-1999	5
2000-2001	7
2002-2003	7
2004-2005	6

The same phenomenon has been documented in studies of word-processing in general, by Bernard Susser (*Computers and Composition* 15.3, 1998, pp. 347-372). Perhaps we are looking at a particular combustion when technology and writing research meet that might be called the “novelty effect.” The plug-in text-checker programs that dominated the market in the 1980’s were more of a breakthrough technology than were the later integrated programs, most of which were just the old stand-alone programs with minor code changes (e.g., Grammatik built into WordPerfect, Correct Grammar into WordStar).

Or maybe we are looking at a commodification of scholarship that parallels the commodification of technology. A new technology often peaks early with number of launched products and then gradually decreases in volume as the few successful products take over the market; so in scholarship an early flurry of pieces is followed by a decline in production as scholars can find less new to say and only a few old pieces are perpetuated through reprints and citations. Let’s hope not. Maybe all we are seeing is teachers losing interest in an aspect of teaching composition, attention to surface features, that more and more they have come to feel is secondary and that they are happy to turn over to mechanical household aids. Then the question is whether teachers are aware

of how poorly the machines are doing the chores or how the students are getting along with the hired help.

In terms of scholarly understanding the bottom line is that there is much still to uncover, as a few recent analyses have brilliantly shown (e.g., McGee & Ericsson 2002, Haist 2004, Kies 2005). May the following bibliography do its small part in encouraging more of the same.

As for the parameters of the bibliography, I have focused rather tightly on hardware and software that supports spell-, grammar-, and style-checking. I do not include computerization of readability formulas, which forms part of many text-checking packages but which technologically and instructionally follows a somewhat different history. Nor do I include much commentary that deals with the development of editing and formatting software for publishing, which often contained grammar and spell-checking components; or with programmed autotutorial instruction (“teaching machines”), which typically dwelt heavily on grammar; or with the CAI interactive tutorial composing programs (TICCIT, WANDAH, HOMER, WORDSWORTH, SEEN, and a host of others), most of which included text-checking capability or links to it. Finally I have, reluctantly, omitted the scholarship on text-checking with special populations, for instance the fascinating work done on hardware and software for the visually handicapped, or for students learning English as a second language (e.g., Cornelia Tschichold, “Grammar checking for CALL: Strategies for Improving Foreign Language Grammar Checkers,” in Cameron, Ed., *CALL: Media, Design and Applications*, 1999, Swets & Zeitlinger, pp. 203-222). Nor have I included the excellent work on accuracy of text-checkers in languages other than English (e.g., Jack Burston, “A Comparative Evaluation of French Grammar Checkers,” *Calico Journal* 13.2/3 (1995), 104-111). Largely I have also excluded the growing literature—because it is a growing technology—on automated grading or scoring of student writing. That material will be found in a bibliography of its own, appearing in *Machine*

Scoring of Student Essays: Truth and Consequences, edited by Patricia Ericsson and myself, in press at Utah State University Press. Finally, I should note that I have mostly omitted mere notices or descriptions of new technology.

There are 349 items. The first, up to about 1970, are here just to indicate a few precursors to the composing and instructional text-checking technology that came later. I have appended a few search terms to each entry, but please do not trust them too much. Here are some non-intuitive search terms.

accuracy: testing of the degree to which text-checking programs succeed in detecting solecisms and ignoring non-solecisms

basic: study involving remedial writing courses

computer-analysis: computerized analysis of text for diagnostic purposes, including checking of spelling, grammar, or style (terms which overlap, of course)

data: study extracting factual information that would allow for replication of the study

instruction: scholarship addressing the teaching of writing anywhere

machine-scoring: computerized analysis of text to give it an evaluative score or grade

record-keeping: computer software that assists information recording, such as grades, attendance, or summed points.

school: study involving grade-school, middle-school, or high-school instruction (the default is post-secondary instruction)

I want to acknowledge the feedback I generously received on this manuscript from Gail Hawisher, Glenn Blalock, and especially Mike Palmquist, who sent me a pre-publication copy of his encyclopedic “Tracing the Development of Digital Tools for Writers and Writing Teachers” (forthcoming), from which I borrowed a few bibliographic items. I’m fully responsible for the opinions above and the facts below, along with any hitches and glitches that MS Word did not catch.

Year	Hardware support	Software application	Journals	Literature
1960-1965	The standard technique is running punch cards in batch mode through a mainframe machine. Text analysis relies mainly on word and phrase matching and frequency counts.	Application of computers to the humanities (especially anthropology, linguistics, literature, and history) has been under way for several decades. For composition instruction, lock-step grammar and spelling programs are being developed to be used in		<ul style="list-style-type: none"> Reitman, Walter R. (1962). Computer models of psychological processes and some implication for the theory and practice of writing. In Steinberg, Erwin Ray (Ed.), <i>Needed research in the teaching of English: Proceedings of a Project English research conference, May 5-7, 1962</i>; Washington, D. C.: U. S. Department of Health, Education, and Welfare, Office of Education. Pp. 98-106. <i>machine-scoring, CAI, computer-analysis</i> Rothwell, Kenneth S. (1962). Programmed learning: A back door to empiricism in English studies. <i>College English</i> 23.4, pp. 245-250. <i>programmed, teaching machine</i> Engelstrom, John; James Whittaker. (1963). Improving

In 1960 Digital Equipment develops the PDP-1, the first minicomputer with keyboard and monitor. IBM's magnetic tape Selectric typewriter is marketed in 1964, allowing users to edit recorded text or erase it and start over. The first local area network (LAN) established, at Rank Xerox Palo Alto Research Center

“teaching machines” such as the Dukane Redi-Tutor, which is a frame-controlled film projector. Early programs are IBM's Teaching Machine Project (eventually installed at Stanford University and 29 other sites), and the University of Illinois's PLATO (Programmed Logic for Automatic Teaching Operations)

1966-1967 Hewlett-Packard introduces a general purpose computer that supports BASIC, FORTRAN, and other computer languages. Standard text manipulation is still fixed 64-character line editing (no wrap-

Computing and the Humanities Newsletter launched in 1966, to become *Computers and the Humanities* the next year.

- students' spelling through automated teaching. *Psychological Reports* 2, pp. 125-126. *programmed, teaching machine*
- Rowland, Devra. (1964). Decade in the life of a programmer. *College Composition and Communication* 15.2, pp. 90-96. *porogrammed, basic, teaching machine, computer-analysis*
- Holsti, Ole R. (1964). An adaptation of the “General Inquirer” for the systematic analysis of political documents. *Behavioral Science* 9.4, pp. 382-388. *computer-analysis, general inquirer, political-science text, semantic*
- Daigon, Arthur. (1966). Computer grading of English composition. *English Journal* 55.1, pp. 46-52. *machine-scoring, computer-analysis, CEEB, spell-checker, usage, style*
- Page, Ellis B. (1966). Grading essays by computer: Progress report. Educational Testing Service (Ed.), *Proceedings of the Invitational Conference on Testing Problems*, October 29, 1966, New York City: Princeton, NJ: Educational Testing Service. Pp. 87-100. *machine-scoring*
- Stone, Philip J.; John Kirsch; et al. (1966). *The General Inquirer: A computer approach to content analysis*. Cambridge, MA: M.I.T Press. *computer-analysis, content-analysis, General Inquirer, essay*
- Weizenbaum, Joseph. (1967). Contextual understanding by

around). At MIT Les Earnest creates a spelling checker of 10,000 common words, which he uses in his program to read cursive writing.

1968 Douglas Engelbart shows full-screen word processing and the mouse at the Fall Joint Computer Conference in San Francisco—for word processing the first step away from the line editors

1969 Data General markets Nova, the first 16-bit mini-computer. IBM produces MagCards for their typewriters, holding about a page of text, a precursor to the floppy disk. First ARPANET

computers. Communications of the Association for Computing Machinery 10. 8, pp. 474-480. computer, word-processing, computer-analysis, contextual

- Bhushan, V.; J. R. Ginther. (1968). Discriminating between a good and a poor essay. Behavioral Science 13.5, pp. 417-420. *computer-analysis, general inquirer, sentence length, vocabulary, semantic*
- Hiller, Jack H.; D. R. Marcotte; T. Martin. (1969). Opinionation, vagueness and specificity-distinctiveness: Essay traits measured by computer. American Educational Research Journal 06.2, pp. 271-286. *computer-analysis, vagueness, opinionation, specificity, data*

network
established
between UCLA,
Stanford, UC Santa
Barbara, and the
University of Utah

1970-
1971

Intel introduces the
RAM chip,
computer storage
that can be
randomly accessed
and written to as
well as read from

Wang is one of the first
to buy the Intel chip, and
introduces their 1200
Word Processing System
the next year. At the
Stanford Artificial
Intelligence Lab, for the
32-bit DECSYSTEM-10
computer,, Ralph E.
Gorin adapts Les
Earnest's spelling
detection and correction
program, calls it SPELL,
and makes it available as
shareware. Autotutorial
programs in spelling,
grammar, and
puncteuation, TICCIT
(Time-shared,
Interactive, Computer-
Controlled Information
Television)_are
developed at Brigham
Young University (1970-
1975).

- Woods, Elinor M. (1970). Recent applications of computer technology to school testing programs. *Review of Educational Research*, pp. 525-539. *review of research, machine-scoring, computer-analysis, school*

1972

“Fourth

Bell Laboratories (A&T) *t*

- Slotnick, Henry B. (1972). Toward a theory of computer essay

generation” computers with circuits of 500 or more transistors in a chip—the hardware essential for the microcomputer. Wang, VYDEC, and Lexitron are developing floppy diskettes, holding more than 200 pages of text.

is developing their UNIX operating system to support word processing

grading. *Journal of Educational Measurement* 09.4. 253-263. *machine-scoring, computer-analysis, theory, measurement, evaluation, content, spelling, diction, syntax, punctuation, paragraph*

1973 Don Lancaster devises the TV Typewriter, which uses memory boards to store 512 characters; a cassette tape provides storage of around 90 pages. The Alto workstation, with a bit-mapped video screen, is created at Xerox Palo Alto Research Center

- Bishop, Robert; Nadean Bishop; Darien Gardner. (1973). Adapting computer-assisted-instruction to the non-programmer. ERIC Document Reproduction Service, ED 081 231. *CAI, computer-analysis, mainframe, programming, Journalism Computer Assisted Instruction, style-checker, vocabulary*
- Koether, Mary, and Esther Coke. (1973). A scheme for text analysis using FORTRAN. ERIC Document Reproduction Service, ED 074 152. *computer-analysis, FORTRAN*

1974-1975 The first two personal computers marketed: Micro

Hewlett-Packard designs the Instructional Dialogue Facility for *First issue of Creative Computing*

- Bishop, Robert L. (1974). Computing in the teaching of journalistic skills. On-line 03.3, pp. 5-12. *computer-analysis, mainframe, journalism course, grammar-checker, passive,*

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|------|--|---|--|
| | Computer Machines's MCM/70 and MITS's Altair 8080 (with LED panel and extension cards for keyboard and screen) | their 2000/F Computer System, with revising and contextual word-search capabilities | <i>spell-checker, JOURNALISM</i> |
| 1976 | Apple Computer markets Apple I. Zilog releases the Z80 chip, an 8-bit microprocessor that becomes the underpinning of the personal and desktop computing for the next decade | Michael Shrayner writes Electric Pencil, considered by some to be the first personal-computer word processing program | <ul style="list-style-type: none"> • Slotnick, Henry B. (1974). Computer scoring of formal letters. <i>Journal of Business Communication</i> 11.2, pp. 11-19. <i>letter-writing, experiment, data, machine-scoring, correlation, holistic, vocabulary-variety, word-length, spelling, computer-analysis</i> |
| 1977 | Three more personal computers marketed: Commodore's PET; Tandy's TRS-80; and Apple II with a floppy disk drive and color graphics | | <ul style="list-style-type: none"> • Riddle, Elizabeth A. (1976). Comparative study of various text editors and formatting systems. Springfield, VA: National Technical Information Service. <i>text-editor, line-editor, computer-analysis, survey</i> • Salton, Gerald and Anita Wong. (1976). On the role of words and phrases in automatic text analysis. <i>Computers and the Humanities</i> 10, pp. 69-87. <i>computer-analysis, lexicon, phrase</i> |
| 1978 | Tandy upgrades the TRS-80 to 32 KB of RAM, with | | <ul style="list-style-type: none"> • Finn, Patrick J. (1977). Computer-aided description of mature word choices in writing. In Cooper, Charles R.; Lee Odell (Eds.), <i>Evaluating Writing: Describing, Measuring, Judging</i>; Urbana, IL: National Council of Teachers of English, pp. 69-90. <i>diction, vocabulary, machine-scoring, computer-analysis</i> • Brown, Francis J. (1978). A computer-calculated index. ERIC Document Reproduction Service, ED 154 337. <i>computer-analysis, readability, Gunning Fog index</i> |

Microsoft operating system, floppy disk, and printer. IBM advertises its Personal Computer. BITNET protocol set for email by Yale and City University of New York

1979

IBM begins work on their own personal computer, to compete with Apple, Tandy, and Commodore—work that would lead to the IBM PC, first shipped in 1981

Micropro International releases WordStar, commercially the most successful word-processing software for several years. It offers an add-on spell-checking program called SpellStar. Lorinda Cherry and Doug Mellroy at Bell Laboratories, consulting with style-analyst William Versterman of

- Card, Stuart Kent. (1978). Studies in the psychology of computer text editing systems [doctoral thesis]. Pittsburgh, PA: Carnegie-Mellon University. *computer-analysis, text-editing, psychological, data*
- Card, Stuart K. (1978). Studies in the psychology of computer text editing systems. Palo Alto, CA: Xerox Palo Alto Research Center. *computer-analysis, editing, text-editor, error, spell-checker*
- Gould, John D. (1978). Composing letters with computer-based text editors (Research Center 8446, No. 36750). Yorktown Height, NY: IBM Research Center. *computer-analysis, text-editor, style-checker, letter writing, business workplace*
- Hartnett, Carolyn G. (1978). Measuring writing skills. ERIC Document Reproduction Service, ED 170 014. *evaluation, measurement, holistic, primary-trait, peer-evaluation, t-unit, sentence-combining, computer-analysis, cohesion, direct-indirect, data, basic, placement*
- Anandam, Kamala; Lorne Kotler; Ed Eisel; Rose Ann Roche. (1979). RSVP: Feedback program for individualized analysis of writing. ERIC Document Reproduction Service, ED 191 511. *computer-analysis, RSVP, Response System for Variable Prescriptions, error, record-keeping*
- Hammer, J. M.; W. B. Rouse. (1979). Analysis and modelling of freeform text editing behavior. In Proceedings of the International Conference on Cybernetics and Society, Denver, 8-10 October, 1979. New York: Institute of Electrical and Electronic Engineers. *experiment, ETUDE, composing, data*
- Horodowich, Peggy Maki. (1979). Developing stylistic awareness on the computer: A tagmemic approach. ERIC Document Reproduction Service, ED 198 530. *computer-analysis, clause, feedback, Hewlett-Packard, Instructional*

Rutgers University, continue to work with the UNIX operating system, developing “style” and “diction” functions. At IBM, George Heidorn and others begin work on EPISTLE, an on-line text-editing program later expanded with a style- and grammar-checker by Karen Jensen and Yael Ravin and marketed as Critique

1980 Commodore’s VIC-20 released, with cassette storage and a TV screen for a monitor. IBM hires Microsoft to write the operating system for their PC. Usenet in operation at the University of North Carolina at Chapel Hill and Duke University

WordPerfect is shipped for Data General minicomputers (\$5,500 per copy), and WordPro for Commodores. Bell Labs releases UNIX 4.1BSD with “style” and “diction” functions. At MIT, Richard Ilson and Michael Good are designing ETUDE, an interactive editing and formatting program

Dialogue Author Facility

- Miller, George A. (1979). Automated dictionaries, reading and writing: Chairman’s report of a conference on educational uses of word processors with dictionaries, June 14-15, 1979; Washington, D. C.: National Institute of Education. *computer-analysis, text-editor, word-processor, spell-checker*
- Anandam, Kamala; Ed Eisel; Lorne Kotler. (1980). Effectiveness of a computer-based feedback system for writing. *Journal of Computer-Based Instruction* 06.4, pp. 125-133. *computer-analysis, RSVP, Response System for Variable Prescriptions, error, record-keeping*
- Card, Stuart K.; T. P. Moran; A. Newel. (1980). Computer text-editing: An information-processing analysis of a routine cognitive skill. *Cognitive Psychology* 12.1, pp. 32-74. *computer-analysis, line-editor, information-processing, cognitive*
- Kanervo, Ellen. (1980). Teaching tips. *Journalism Educator* 35.3, pp. 18-27. *computer-analysis, style-checker, grammar-checker, grading, journalism course*
- Moe, A. J. (1980). Analyzing text with computers. *Educational Technology* 30.7, pp. 29-31. *computer-analysis, text-editor, editing, readability, grammar-checker, spell-checker*
- Peterson, James Lyle. (1980). Computer programs for detecting and correctly spelling errors. *Communications of the*

- 1981 Sinclair's ZX81 released, a home computer with a cheap membrane keyboard, output to the TV set, and storage on an ordinary audio tape recorder. The first portable computer is released, the Osborne 1, weighing almost 24 pounds. Xerox introduces its Star Workstation, with a bit-mapped display on a monitor, icons, mouse, and ethernet.
- IBM markets their PC with Microsoft-DOS operating system; with it is available a spell-checker, a plug-in package. LifeTree Software is founded and begins work on Correct Grammar, a stand-alone which will earn \$4,000,000 in 1990. In collaboration with Kate Kiefer and Charles Smith at Colorado State University, Nina Macdonald, Lorinda Cherry, and other UNIX people at Bell Laboratories continue work toward Writer's Workbench
- Association for Computing Machinery 23 (December), pp. 676-687. *computer-analysis, spell-checker*
- Peterson, James Lyle. (1980). Computer programs for spelling correction: An experiment in program design. Berlin; New York: Springer-Verlag. *computer-analysis, programmed, spell-checker*
 - Cherry, Lorinda L. (1981). Computer aids for writers. Proceedings of the ACM SIGPLAN 16.6, pp. 61-71. *computer-analysis*
 - Cherry, Lorinda L.; William Vesterman. (1981). Writing tools: The "Style" and "Diction" programs (Computing science technical report, No. 91). Murray Hill, NJ: Bell Labs. *computer-analysis, style-checker, diction*
 - Cronnell, Bruce; Ann Humes. (1981). Using microcomputers for composition instruction. ERIC Document Reproduction Service, ED 203 872. *word-processing, computer-analysis, grammar-checker, revising, instruction*
 - Frase, Lawrence T. ; et al. (1981). Computer aids for text assessment and writing instruction. Performance and Instruction 20.9, pp. 21-24. *computer-analysis, practice, CAI*
 - Frase, Lawrence T. (1981). Ethics of imperfect measures. IEEE Transactions on Professional Communications 24.1, pp. 49-50. *computer-analysis, readability-formula, measurement, accuracy*
 - Frase, Lawrence T.; Nina H. MacDonald; Patricia S. Gingrich; Stacey A. Keenan; J. L. Collymore. (1981). Computer aids for text assessment and writing instruction. NSPI Journal 20.9, pp. 21-24. *Writer's Workbench, computer-analysis, grammar-checker*
 - Good, Michael. (1981). ETUDE and the folklore of user interface design. SIGPLAN Notices 16.6, pp. 34-43. *computer-analysis, software, ETUDE, text-editor*
 - Milic, Michael J. (1981). Stylistics + computers = pattern

- stylistics. *Perspectives in Computing* 01 (December), pp. 4-11. *computer, word-processing, computer-analysis, style-checker*
- Miller, Lance A.; George E. Heidorn; Karen Jensen. (1981). Text-critiquing with the EPISTLE system: An author's aid to better syntax. In Orden, Alex (Ed.), 1981 National Computer Conference: May 4-7, 1981, Chicago, Illinois; Arlington, VA: American Federation of Information Processing Societies Press, pp. 649-655. *style-checker, EPISTLE, syntax, practice, computer-analysis, software, phrase matching*
 - Oates, William. (1981). An evaluation of computer-assisted instruction for English grammar review. *Studies in Language and Literature* 03, pp. 193-200. *pre-post, experiment, CAI, journalism course, PLATO, gain, data, grammar-checker, computer-analysis*
 - Schwartz, Helen J. (1981). Teaching stylistic simplicity with a computerized readability formula. Paper presented and the International Conference of the American Business Communication Association. ERIC Document Reproduction Service, ED 196 014. *computer-analysis, readability, instruction, style, STAR*
 - Shipley, Linda J. ; James K. Gentry. (1981). How electronic editing equipment affects editing performance. *Journalism Quarterly* 58, pp. 371-374, 387. *computer, word-processing, editing, data, process, computer-analysis*
 - Smith, Raoul N. (1981). Computerized aids to writing. In Frawley, William (Ed.), *Linguistics and literacy*: New York: Plenum Press, pp. 189-208. *style-checker, computer-analysis, Writer's Workbench, Epistle, revising, feedback, database, format, logical transition*
 - Turba, T. N. (1981). Checking for spelling and typographical errors in computer-based text. *SIGPLAN Notices* 16.6, pp. 51-60. *computer-analysis, spell-checker, text-editor*

- 1982 **Compaq offers their Compaq Portable. Sinclair ZX Spectrum, and Commodore 64 is released at much cheaper prices. First true laptop is marketed, the GRiD Compass 1101, with clamshell design (it sold for \$10,000 and was used mainly by the military)**
- WordPerfect—originally written by Satellite Software for minicomputers—is released in DOS format for the IBM PC
- Cherry, Lorinda L. (1982). Writing tools. *IEEE Transactions on Communications* 30.1, pp. 100-105. *computer-analysis, Bell Laboratory*
 - Coke, Esther U. (1982). Computer aids for writing text. In Jonassen, David H. (Ed.), *The technology of text* [Vol. II]: Principles for structuring, designing, and displaying text; Englewood Cliffs, NJ: Educational Technology Publications. Pp. 383-399 *computer-analysis, word-processing, process, planning, Linda Flower, John Hayes, text-editing, readability, CRES [computer readability editing system], Writer's Workbench, spell-checker, style-checker, grammar-checker*
 - Collier, Richard M. (1982). The effect of computer-based text editors on the revision strategies of inexperienced writers. ERIC Document Reproduction Service, ED 211 998. *computer-analysis, text-editor, revising, two-year college, case-study, think-aloud protocol, instruction, data*
 - Cottey, Patricia. (1982). An overview of the computer as teacher: A progress report of a research project to introduce diagnostic testing and computerized instruction into the composition program at Northeast Missouri State University. ERIC Document Reproduction Service, ED 217 490. *computer-analysis, grammar-checker, instruction, basic, programmed, diagnostic, PLATO*
 - Cronnell, Bruce. (1982). Computer instruction for generating and revising/editing narrative text. Los Alamitos, CA: Southwest Regional Laboratory for Educational Research and Development [ERIC Document Reproduction Service, ED 223 244]. *CAI, interactive, practice, word-processor, revising, editing, style-checker, computer-analysis*
 - Cronnell, Bruce. (1982). Computer-based practice in editing. ERIC Document Reproduction Service, ED 220 869. *CAI, instruction, editing, computer-analysis, mainframe, text-editor*
 - Foma, Eleanor. (1982). Word processing text-editing: Massed versus spaced practice. *Journal of Studies in Technical*

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- 1983 Apple, IBM, and Xerox introduce personal computers with graphical user interface (icons and pop-up menus), disk drive, and printer. Apple's Lisa has a detached keyboard and mouse. Various laptops introduced: The Gavilan, the Kyotronic 85, and Sharp's PC-5000
- Volkswriter and WordPlus-PC, both word-processing software, are available for the IBM PC. Weber State College collaborates with Automated Language Processing Systems to develop a text-analysis program, ALPS, for their writing program; it includes a readability analysis and style chart.
- The first professional journals for writing teachers dealing with computers are launched: *Research in Word Processing Newsletter* (edited by Bradford A. Morgan) and *Computers and Composition* (edited by Cynthia L. Selfe and Kathleen E. Kiefer)—along with *PC World*
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- 1985 **CD-ROM technology marketed by Philips and Sony. Commodore's Amiga home computer arrives with a multitasking operating system. Introduction of Adobe's PostScript, a page description language for printers.**
- Microsoft Windows OS issued, with user interface similar to Macintoshes. WordStar and WordPerfect are available now with spell-checkers. Some stand-alone spell-checking programs available this year (or within one or two years) are Spellex, Spellbinder, Spelling Sentry, AutoSpell, WordSpring, SpellMagic, QuickSpell, and Spell Catcher (originally named Thunder!). Bruce Wampler co-founds Reference Software International and begins work on Grammatik, grammar-checking software. ALPS released for the Macintosh as MacProof, a plug-in without the readability diagnosis but with Usage, Grammar,
- First issues of MacWorld: The Macintosh Magazine, as well as the Journal of Educational Computing Research and Computers in Human Behavior*
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- 1986 **Apple releases the Macintosh Plus, with 4 MB of** **Microsoft Word 3.0 marketed, with a spell-checker and a thesaurus.** **First issue of *The Computer-Assisted Composition*** • Call, Barbara. (1986). Word-processing trends: Vendors add spelling checkers to improve market position. *PC Week* 3.6, pp. 71-92. *spell-checker, computer, word-processing,*

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Batteries Included releases PaperClip II, a low-cost word-processing package for Commodore 64, with spell-checker. There are now on the market many word-processing packages: WordPerfect, WordStar, Officewriter, Microsoft Word, MacWrite, Multimate Advantage, Displaywrite, Samra Word, Professional Write, Webster's New World Writer, PC-Write

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 Merle Tenney of
 Lexpertise Linguistic
 Software helps develop
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- 1989 **World Wide Web is invented by Tim Berners-Lee. Intel releases its 80486 DX, which can run at 25 MHz—later versions will quadruple this performance**
- Microsoft Word 4.0 is introduced, with built-in word count and spell-checker. PenPal and Scribble! are now available for Commodore's Amiga personal computers, containing 100,000+ vocabularies for spell-checker, accuracy, data, style, error, Critique
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| 1990 | Microsoft Windows 3.0 and Macintosh Classic released, both with faster processing speeds | The Classic has a grammar checker but the user must allocate memory for it. At the University of Utah, Emil Roy compares RightWriter style-analysis to human raters to see if the machine can serve as a writing-placement mechanism. | <ul style="list-style-type: none"> • Schwartz, Helen J.; Diane P. Balestri; Brian Gallagher; Nancy Kaplan; Christine M. Neuwirth; Tori Haring-Smith. (1989). Computers in writing instruction: Blueprint for success. In Graves, William H. (Ed.), <i>Computing across the curriculum: Academic perspectives</i>; McKinney, TX: Academic Computing Publications, pp. 141-203. <i>review-of-research, bibliography, annotated, computer-analysis</i> • Sirc, Geoffrey. (1989). Response in the electronic medium. In Anson, Chris M. (Ed.), <i>Writing and response: Theory, practice and research</i>; Urbana, IL: National Council of Teachers of English. Pp. 187-208. <i>CAI, computer-analysis, response, grammar-check, spell-check</i> • Smith, Charles R. (1989). Text analysis: The state of the art. <i>Computer-assisted Composition Journal</i> 03.2, pp. 68-78. <i>computer-analysis, Writer's Workbench, teacher-opinion, Critique, data, accuracy</i> • Dobrin, David N. (1990). A new grammar checker. <i>Computers in the Humanities</i> 24.1-2, pp. 67-80 <i>grammar-checker</i> • Douglas, S. (1990). Intelligent text processing: A survey of the available products. HCRC Technical Report [University of Edinburgh]. <i>grammar-checker, accuracy, Correct Grammar, Grammatik, MacProof, RightWriter, Sensible Grammar, StyleWriter</i> • Furugori, Teiji. (1990). Improving spelling checkers for Japanese users of English. <i>IEEE Transactions on Professional Communication</i> 33.3, pp. 138-142. <i>technical-communication, computer-analysis, spell-checker, ESL, Japanese-English</i> • Goddard, M. Lee. (1990). Avoiding teacher burnout in evaluating business communication assignments. <i>ABCA Bulletin</i> 53.1, pp. 23-35. <i>business communication, instruction, response, computer-analysis, style-checker</i> • Hanson, Luett. (1990). Computer-aided remediation for grammar, punctuation. <i>Educator</i> 44.4, pp. 43-49. <i>computer-</i> |
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1991 **Linus Torvalds offers free his operating system, Linux**

WordStar purchases Lifetree Software's Correct Grammar. MacWord 5.0 includes a grammar-checker (which often crashes when opened). There are now many stand-alone grammar-checkers for DOS and Windows, including Reference Software's Grammatik, Artificial Linguistic's PowerEdit (bought by Oracle in 1993), Eric Johnson's StrongWriter, Lifetree's Correct Grammar, Que Software's RightWriter, Avalanche's ProofPositive, McGraw-Hill's Edit!, Sensible Software's Sensible Grammar, and Systems Compatibility's Writer's ToolKit

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1992

Microsoft Word 5.0 marketed, with the first integrated grammar-checker. It is not automatically installed, however, in part because the package is a memory hog. Bruce Wampler sells his Grammatik

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