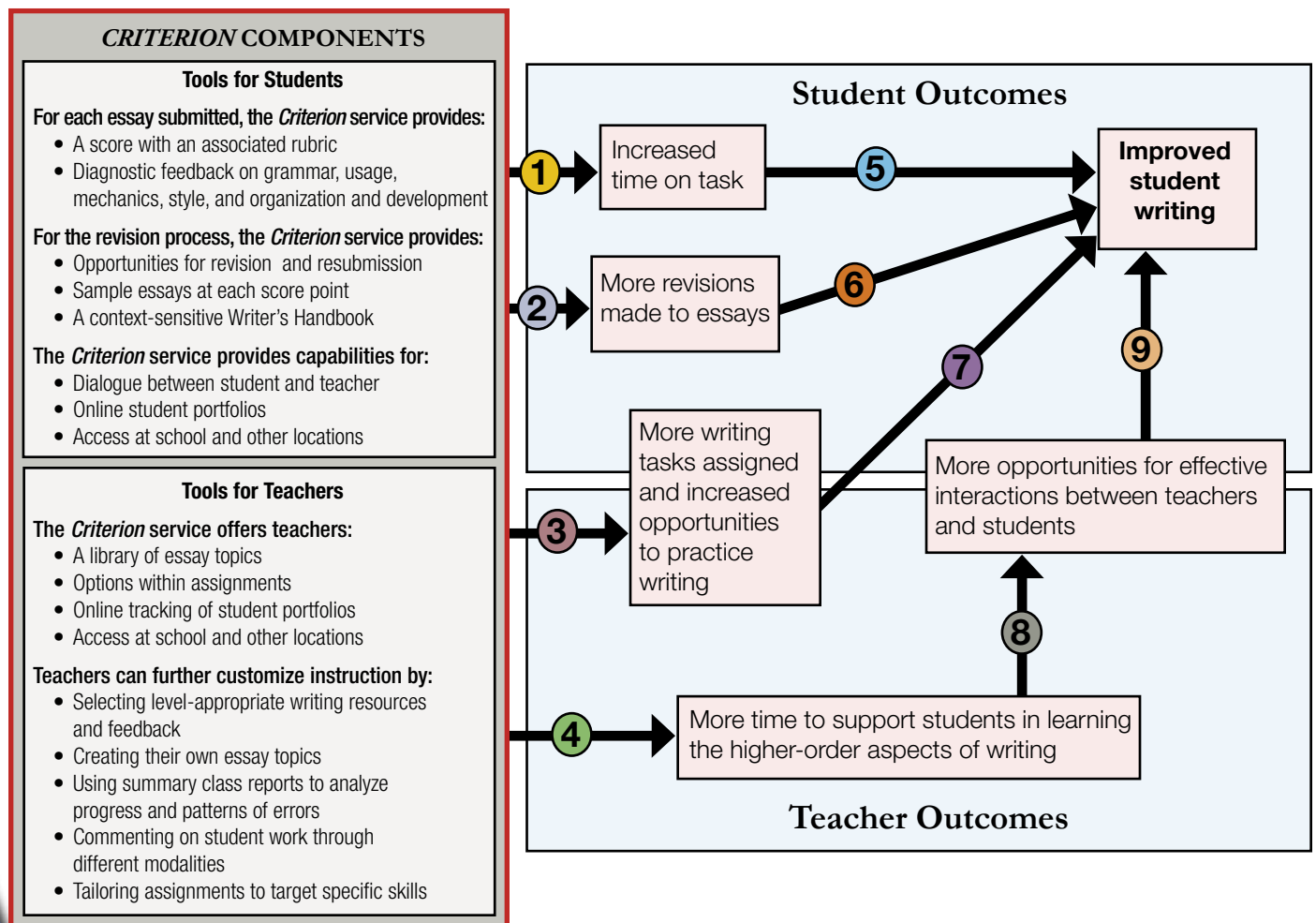




Research Basis for the *Criterion*SM Online Writing Evaluation Service

ETS invests substantial resources in designing products to improve student learning and in evaluating their effects. One such product — the *Criterion*SM Online Writing Evaluation Service — was designed to do just that. The *Criterion* service supports classroom instruction and assessment by giving students an overall score and immediate, individualized, constructive and specific diagnostic feedback on their essays. Those components improve the writing loop (planning, drafting, feedback, revising and sharing work) by providing a mechanism for students to draft essays, receive immediate feedback, and revise work in the same or consecutive class periods.

While we don't yet have results from randomized controlled trials that demonstrate the *Criterion* service's ability to improve student writing, this document sets out our thoughts on how the *Criterion* service might improve student writing, if used regularly and appropriately. This document also describes evidence from studies that did not use the *Criterion* service, but that generally support our position. In the diagram below, each numbered arrow refers to specific supporting evidence that is detailed in the research document that accompanies this discussion.





Research Summary

Research tells us that providing immediate, individualized and specific feedback encourages students to write more extensively, to revise their work more intensively, and that using information technology in the classroom increases the time students spend on writing (e.g., Beach, 1979; Covill, 1997; Etchison, 1989; Fitzgerald, 1987; Goldberg, Russell, & Cook, 2003; Kluger & DeNisi, 1996; Solomon, Lutkus, Kaplan, & Skolnik, 2004).

Research shows that using technology for classroom assignments gives teachers more time to support students in learning the higher-order aspects of writing and to interact with individuals and with the whole class (e.g., Greenwald, Persky, Campbell, & Mazzeo, 1999; Solomon et al., 2004; Tiene & Luft, 2001).

When students increase their writing and revising activities and teachers have time to interact with students on a deeper level, students will make more improvements in writing skills and overall writing quality (e.g., Bardine, Bardine, & Deegan, 2000; Butterfield, Hacker, & Plumb, 1994; Cochran-Smith, 1991; Fitzgerald, 1987; Gentile, 1992; Goldberg et al., 2003; Greenwald et al., 1999; Lehr, 1995; Solomon et al., 2004; Tiene & Luft, 2001; U.S. Department of Education, National Center for Education Statistics [NCES], 1999).

For more details of this summary, see the Full Description of the Research Foundation.

Copyright © 2006 by Educational Testing Service. All rights reserved. ETS and the ETS logo are registered trademarks of Educational Testing Service (ETS). CRITERION, SYSTEM 5 and the SYSTEM 5 logo are trademarks of ETS.

*Listening.
Learning.
Leading.*





The *Criterion*SM Service: Full Description of the Research Foundation

Within each box below, there are three pieces of information: (1) specific research for how the product leads to the identified outcome; (2) a generalization about the associated challenges in today's classrooms, and (3) information on how the product addresses both the research and the challenges.

Using computers when learning to write engages students and results in **Increased Time on Task**

A **research** summary (Goldberg et al., 2003) found that, on average, students who use computers when learning to write are more engaged and motivated in their writing. In earlier research, Etchison (1989) found that students who used computers for composition classes spent more time producing text than students who used traditional paper-and-pencil methods. Greenwald et al. (1999) showed that nearly 75% of students in grades 4, 8, and 12 used computers for writing drafts or final versions at least once or twice a month (more than a third of all students did so at least once a week). Additionally, "in 70% of fourth-grade and 68% of eighth-grade classrooms, teachers believed that computer use had changed student writing" (Solomon et al., 2004, p. 27). Specifically, when students use computers, teachers reported "an increase in students' motivation and an increase in students' time spent on writing and revising their work" (Solomon et al., p. 27).

In general, students enjoy working with computers, are generally competent users, and tend to write more when using computers.

The **Criterion** service is an online writing service that gives students access to writing assignments at any location where a computer and an Internet connection are available.

Giving students task-specific feedback results in **More Revisions Made to Essays**

Research suggests that giving students feedback on their writing results in significantly more revisions (Beach, 1979; Fitzgerald, 1987). Interestingly, Covill (1997) found that students are looking for feedback to improve their work. Furthermore, a research summary by Kluger and DeNisi (1996) suggested feedback that supports learning at the task level is likely to yield impressive gains in performance. In 1998, a high percentage of classrooms (87% fourth-grade and 91% eighth-grade) had teachers mentioning the importance of giving feedback to students (Solomon et al., 2004). "Whether feedback took the form of a one-on-one conference, comments based on a rubric or list of requirements, written comments on submitted work or more generalized comments to the whole class, teachers reported that students do make changes in their writing as a result of feedback" (Solomon et al., p. 12).

In general, teachers do not assign as many writing tasks as they would like because of the time it takes to provide feedback to students. Due to the amount of time between when a student hands in an assignment and when he/she receives feedback, the student might have already made revisions or might not read the comments and just look at the final grade.

The **Criterion** service provides students with individualized, instant diagnostic feedback on each essay and each revision that they submit, specifically in the areas of organization and development; style; and grammar, usage, and mechanics.

Use of technology by teachers and students leads to
More Writing Tasks Assigned and Increased Opportunities to Practice Writing

Research from Tiene and Luft (2001) stated that one significant challenge for public schools is to provide meaningful assignments at an appropriate level of difficulty for all students. Teachers who participated in this study felt that individualized instruction was fostered by a technology-rich environment.

In general, the majority of teachers and students are comfortable using computer programs such as Microsoft Word. Computer programs that help students with their writing are regarded by teachers as supplements to in-class writing instructional strategies.

The **Criterion** service provides a library of grade-level, genre-specific prompts that teachers can select to create individual or class writing assignments. The **Criterion** service also provides the opportunity for teachers to create their own essay topics where students receive feedback and an overall score. Teacher-designed writing prompts can give students additional writing tasks and practice that are specific to their curriculum and/or state standards.

Assigning writing tasks on a computer gives teachers
More Time to Support Students in Learning Higher-Order Aspects of Writing

Research from Tiene and Luft (2001) described results of a study examining classroom dynamics in a technology-rich learning environment. Overall, teachers felt that using technology gave them more opportunities to interact individually with students. The teachers also felt that higher-order thinking skills were developed, thereby leading to higher student achievement.

In general, it is difficult to differentiate instruction and spend time with individual students. Class size, a broad curriculum, and large ranges in ability can force teachers to teach to the middle of the class. Typically, teachers can spend more time working with individual students and assign individualized tasks when their class is engaged with computer-based assignments.

The **Criterion** service provides students and teachers with computer access to writing assignments, diagnostic feedback, and scores. These features allow additional time for teachers to help individual students with their specific instructional needs and to choose individualized essay prompts for each student or class.

Increased Time in Task helps to support Improved Student Writing Skills and Overall Writing Quality

Research reviewed by Cochran-Smith (1991) showed that students spend a greater amount of time writing and produce slightly longer, neater, and more error-free texts when they use computers than when they handwrite. In a more recent research summary on the effects of computers on student writing, Goldberg et al. (2003) found that students are more engaged and motivated when using a computer and therefore they produce higher quality and longer written work.

In general, when students spend more time writing, their writing improves. It can be difficult to engage students in multiple or extended writing tasks, and students might be more motivated to write when using a computer.

The **Criterion** service is a computer application that allows students to compose, edit, and revise essays either in school or at home. This increased access to writing assignments outside the classroom and increased motivation within the classroom can lead to improvements in writing skills and overall writing quality.

More Revisions Made to Essays leads to Improved Student Writing Skills and Overall Writing Quality

Research in 1992 showed that less than 1% of students in American classrooms made major revisions to their writing (Gentile, 1992) even though a positive correlation between writing quality and revisions had been found (Butterfield et al., 1994; Fitzgerald, 1987). Although the design of NAEP studies does not allow us to infer causality, Greenwald et al. (1999) found that students in grades 8 and 12 “who were always asked to write more than one draft of a paper had higher average scale scores than did their peers who were sometimes or never asked to do so” (p. 92). And Solomon et al. (2004) reported that “eighth graders who wrote drafts on the computer one or two times a month performed better than students who never used computers to write drafts” (p. 27).

In general, the more revisions students make, the better their writing. However, students are unlikely to make revisions without feedback. In today’s classrooms, it is often unrealistic for teachers to expect multiple drafts for every assignment. In addition, providing individualized feedback is time-intensive for teachers, and therefore, the number of revisions that students can submit is limited.

The **Criterion** service provides individualized feedback to help students reflect on their own writing and gives students the opportunity to revise and resubmit their writing for further evaluation, thus improving their work.

More Writing Tasks Assigned and Increased Opportunities to Practice Writing helps to support Improved Student Writing Skills and Overall Writing Quality

Research shows that increased evaluation and feedback can improve student learning. Although the design of NAEP studies does not allow us to infer causality, NCES (1999) showed “students who said they wrote long answers on a weekly or monthly basis had higher scores than those who said they did twice a year or less” (p. 10). In addition, Greenwald et al. (1999) showed that “at grades 8 and 12, students who used computers for writing drafts or final versions at least once a week or once or twice a month had higher scores than their peers who reported never or hardly ever using computers for this purpose” (p. 90).

In general, when students are assigned more tasks and given more opportunities to practice, their writing improves. However, students are unlikely to practice their writing unless a formal assignment is given. In today’s classrooms, teachers are unlikely to assign more writing tasks than are currently in their syllabus because of the time-intensive nature of the grading. Therefore, the number of assignments given to students is limited.

The **Criterion** service provides students with increased opportunity for writing practice and evaluation. The **Criterion** service also gives students individualized feedback and many opportunities to revise their work.

More Time to Support Students in Learning the Higher-Order Aspects of Writing leads to More Effective Interactions Between Teachers and Students

Research from Tiene and Luft (2001) showed that when teachers had more time to work individually with students (because they were using technology), they had more opportunities to motivate, guide, inform, clarify, explain, and encourage students. In addition, they found that when teachers had more time, their teaching was more effective and they worked in more flexible ways to meet the individual needs of their students. Solomon et al. (2004) reported that “39% of both fourth-grade and eighth-grade classrooms indicate they would like more time in general for writing instruction” (p. 36). Additionally, “teachers indicated that they spent between one and three hours on writing instruction during a typical week” (Solomon et al., p. 26).

In general, many teachers report they would like to spend more time on writing instruction. A few hours a week does not allow them sufficient time to interact with students regarding the writing loop: planning, drafting, receiving feedback, revising, and sharing work. Teachers need help finding ways to use classroom time more effectively.

The **Criterion** service allows teachers the time to support students in the higher-order features of writing, either individually or as a whole class, by changing the teachers’ role in writing instruction. The **Criterion** service identifies student errors, allows students to work at their own pace, and provides an overall score to students, allowing the teacher to create more opportunities to interact with their students regarding other aspects of their writing.

More Effective Interactions Between Teachers and Students lead to Improved Student Writing Skills and Overall Writing Quality

Research has shown that when teachers create opportunities for dialogue about student writing, they report that students focus less on grades and more on overall writing quality, pay more attention to comments, and understand feedback better (Bardine et al., 2000). Although the design of NAEP studies does not allow us to infer causality, Greenwald et al. (1999) and Solomon et al. (2004) found that students who were consistently afforded the opportunity to discuss their writing with teachers outperformed peers who participated in this dialogue only occasionally. In addition, Lehr (1995) found positive results when there was direct teacher intervention related to student writing.

In general, when students are given opportunities to interact with teachers regarding their writing, the overall quality of their writing improves. In today's classrooms, teachers are often unable to create these interactions due to large class sizes, packed curriculum, and other factors.

The *Criterion* service provides scores and feedback on surface-level errors, thereby allowing the teacher to focus on providing feedback about content, to discuss writing in depth with students, and to provide direct guidance in the critical stages of the writing and revising processes.

- Bardine, B. A., Bardine, M. S., & Deegan, E. F. (2000). Beyond the red pen: Clarifying our role in the response process. *English Journal*, 90(1), 94-101.
- Beach, R. (1979). The effects of between-draft teacher evaluation versus student self-evaluation on high school students' revising of rough drafts. *Research in the Teaching of English* 13(2), 111-119.
- Butterfield, E. C., Hacker, D. J., & Plumb, C. (1994). Topic knowledge, linguistic knowledge, and revision skill as determinants of text revision. In J. S. Carlson (Series Ed.) & E. C. Butterfield (Vol. Ed.), *Advances in cognition and educational practice: Vol. 2. Children's writing: Toward a process theory for the development of skilled writing* (pp. 83-143). Greenwich, CT: JAI Press.
- Cochran-Smith, M. (1991). Word processing and writing in elementary classrooms: A critical review of related literature. *Review of Educational Research*, 61, 107-155.
- Covill, A. (1997). Students' revision practices and attitudes in response to surface-related feedback as compared to content-related feedback on their writing. *Dissertation Abstracts International*, 58. (UMI No. 9716828)
- Etchison, C. (1989). Word processing: A helpful tool for basic writers. *Computers and Composition* 6(2), 33-43.
- Fitzgerald, J. (1987). Research on revision in writing. *Review of Educational Research*, 57(4), 481-506.
- Gentile, C. (1992). *Exploring new methods for collecting students' school-based writing: NAEP's 1990 Portfolio Study*. Washington, DC: U.S. Government Printing Office.
- Goldberg, A., Russell, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992 to 2002. *The Journal of Technology, Learning, and Assessment*, 2(1). Retrieved February 6, 2006, from http://www.bc.edu/research/intasc/jtla/journal/pdf/v2n1_jtla.pdf
- Greenwald, E. A., Persky, H. R., Campbell, J. R., & Mazzeo, J. (with Jenkins, F., & Kaplan, B.). (1999). *The NAEP 1998 writing report card for the nation and the states*, (NCES 1999-462). Washington, DC: National Center for Education Statistics.
- Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin*, 119(2), 254-284.
- Lehr, F. (1995). *Revision in the writing process*. Bloomington, IN: ERIC Clearinghouse on Reading English and Communication.
- National Center for Education Statistics. (1999). *The NAEP 1998 reading report card - National & state highlights* (NCES 1999-479). Washington, DC: Author.
- Solomon, C., Lutkus, Anthony D., Kaplan, B., & Skolnik, I. (2004). *Writing in the nation's classrooms - Teacher interviews and student work collected from participants in the NAEP 1998 Writing Assessment* (ETS NAEP Tech. and Res. Rep. No. ETS-NAEP 04-R02). Princeton, NJ: ETS.
- Tiene, D., & Luft, P. (2001). Classroom dynamics in a technology-rich learning environment. *Learning & Leading With Technology*, 29(4), 10-13.
- Further Reading**
- Burstein, J., Chodorow, M., & Leacock, C. (2004, Fall). Automated essay evaluation: The Criterion Online Writing Service. *AI Magazine*, 25(3), 27-36.
- The National Writing Project, & Nagin, C. (2003). *Because writing matters—Improving student writing in our schools*. San Francisco: Jossey-Bass.
- Copyright © 2006 by Educational Testing Service. All rights reserved. ETS and the ETS logo are registered trademarks of Educational Testing Service (ETS). CRITERION, SYSTEM 5 and the SYSTEM 5 logo are trademarks of ETS.