

Chapter 45

The Writing–Pal: Natural Language Algorithms to Support Intelligent Tutoring on Writing Strategies

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ABSTRACT

The Writing-Pal (W-Pal) is an intelligent tutoring system (ITS) that provides writing strategy instruction to high school students and entering college students. One unique quality of W-Pal is that it provides feedback to students' natural language input. Thus, much of our focus during the W-Pal project has been on Applied Natural Language Processing (ANLP). This chapter describes W-Pal and various NLP projects geared toward providing automated feedback to students' writing during writing strategy training and practice.

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INTRODUCTION

Our motivation to develop W-Pal rests on two underlying assumptions. First, we assume that writing well is important to academic as well as professional success (Geiser & Studley, 2001; Light, 2001; Sharp, 2007). Writing skills allow individuals to articulate ideas, argue opinions, and synthesize multiple perspectives. Effective writing is essential to communicating persuasively with others, including teachers, peers, colleagues, co-workers, and the community at large (Connor, 1987; Crowhurst, 1990; National Commission on Writing, 2004).

Second, we assume that strategies facilitate performance on tasks, and that teaching students to use strategies can hasten the acquisition of skills (McNamara, 2009). Strategies have been found to facilitate and enhance performance on a variety of learning-related tasks, which leads to the expectation that the same might be found for writing. Many students lack the skills necessary to successfully communicate in writing. For example, the 2002 NAEP report (Institute of Education Sciences, 2003) indicated that more than two thirds of American students scored *below* their proficiency levels in writing assignments (4th graders: 72%; 8th graders: 69%; 12th graders: 79% below proficiency appropriate for their grade level). In addition, only 2% of the students in these three sample grades wrote at advanced levels. We believe that the solution lies not in continuing to correct their grammar and spelling (Shaughnessy, 1977), but rather in teaching students powerful writing strategies that scaffold them toward more effective written communication, meeting a wide array of writing needs applicable to many writing genres.

The difference between skills and strategies is central to understanding the purpose and intent of W-Pal. Skills are acquired through *deliberate* practice over long periods of time (Ericsson, 2006). For example, reading skills are acquired from very early childhood to young adulthood (Ericsson &

Kintsch, 1995). Like reading skills, writing skills also take time to acquire. Skilled writers have likely engaged in extensive deliberate practice, received feedback on their work, and have likely written for a wide variety of genres (e.g., essays, letters, summaries, short responses, etc.). Through these experiences, children slowly acquire the necessary skills to be successful writers. For example, the use of correct grammar is gained through extensive instruction, practice, and feedback. Likewise, correct spelling is based on a relatively stable body of knowledge, constructed over time, again with extensive instruction, exposure, practice, and feedback. Correct grammar and spelling cannot come from a simple mnemonic or a couple of hours of practice. Hence, grammar and spelling are considered skills, and are, by consequence, not a focus of W-Pal. By contrast, *freewriting* is a strategy that can be taught and practiced relatively quickly (and refined over time through practice). Similarly, there are strategies to help students plan, construct, assess, and revise their writings. These strategies are rules of thumb, short-cuts, and mnemonics that can help less skilled students to compensate for their weaknesses in the short term and become skilled writers in the long term.

AN OVERVIEW OF W-PAL

W-Pal consists of two principle components: *Strategy Training* and *Essay Writing*. The Strategy Training Component includes lessons that correspond to the three phases of the writing process: *Prewriting*, *Drafting*, and *Revising*. Training modules are provided for strategies that facilitate each phase of writing. Prewriting modules include Freewriting, and Planning. Drafting strategies include

- Introduction Building
- Body Building, and
- Conclusion Building.

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